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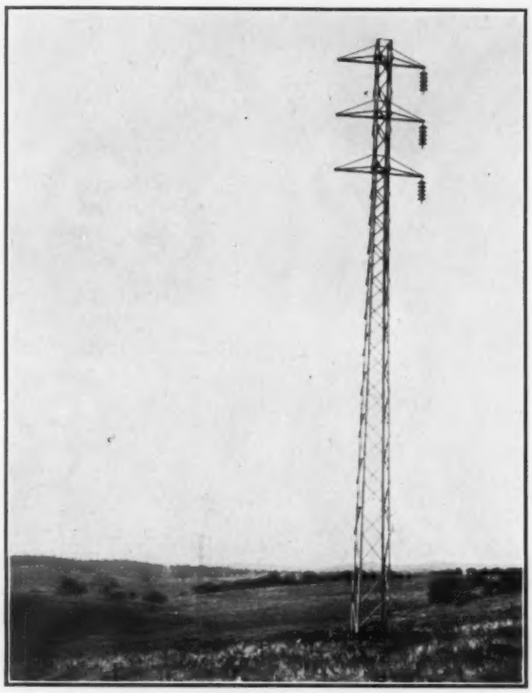

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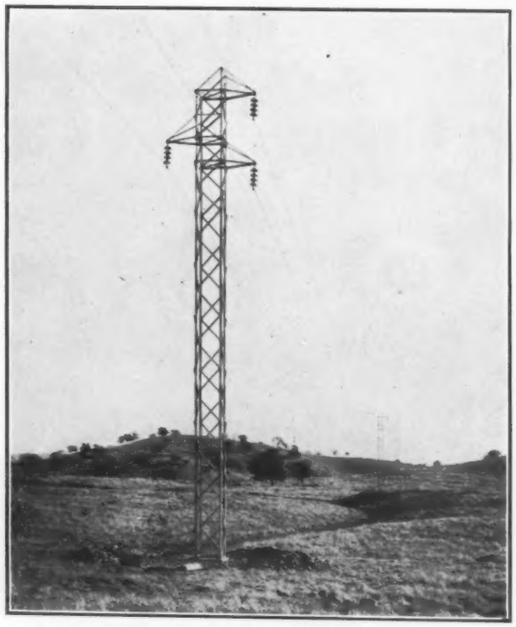

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G. R. HENNINGER, *Associate Editor*
W. A. CYR, *Associate Editor*
D. D. PEEDE, *News Editor*
B. H. SNOW, *Northwest Editor*

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APPRAISALS

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Developing Oil Field Load

A REVIEW of the experiences of the San Joaquin Light & Power Corporation in exploiting oil field electrification and building a load from three pumping motors in 1910 to 22,143 kw. in 1928.

An electrically drilled well in the South Dome, Kettleman Hills.

CRUDE oil was discovered in the San Joaquin Valley in 1877 at McKittrick. The first producing well was brought in at Maricopa in 1890 and in 1898 the famous Kern River fields came into production. In the years that followed the steam engine was king in the oil fields, for it was not until July, 1910, that three variable-speed oil well motors were installed on the property of the Good Luck Oil Company. This marked the initial application of electricity to oil field operations in the territory of the San Joaquin Light & Power Corporation. By January, 1928, this load had increased to 22,143 kw., covering every phase of oil field operations with an annual consumption in 1927 of more than 73,000,000 kw.-hr. Since then curtailment of operations of the oil companies has somewhat decreased both the connected load and the annual consumption.

The interim between the initial installation in 1910 and the present time has been a period of ever-widening application of electric power in the oil industry. The first signal victory for electricity was in 1911 when the Chanslor-Canfield-Midway Company purchased 115 pumping motors for completely electrifying one of its leases. By 1913 39 companies in the San Joaquin Valley were pumping 669 wells with electric power and it was estimated that during that year 1,200 additional motors were installed in that territory. In addition, electricity had begun to obtain a foothold for drilling, dehydration, operating air compressors, and for driving gathering pumps as well as for pumping wells and lighting derricks. Since that time the increase in load on the lines of the San Joaquin company has largely followed the expansion of the oil industry as the accompanying table indicates. At the present time it is estimated that 2,389 of the 5,054 producing wells in the territory served by the company are now pumping electrically and that electric motors will drill 41 of the 130 new wells put down during 1929.

Growth of Oil Field Load on the Lines of the San Joaquin Light & Power Corporation.

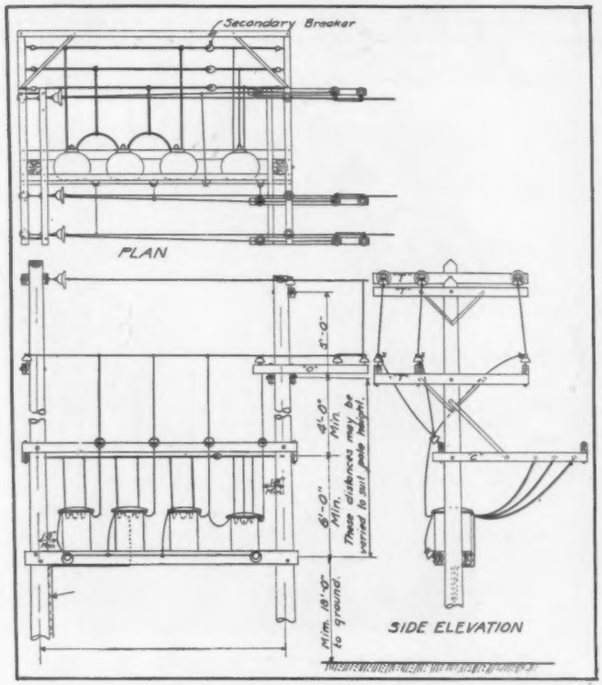
Year	Kw.-hr. Used	Connected Load* (kw.)
1917	14,606,784	4,340
1918	13,784,558	4,164
1919	33,084,653	10,110
1920	32,268,789	9,748
1921	36,316,959	10,855
1922	44,642,054	13,369
1923	44,881,064	13,565
1924	55,149,042	15,126
1925	61,354,006	19,068
1926	66,261,666	21,877
1927	73,706,532	22,143
1928	66,837,400	15,254**

* Connected load as of Dec. 31, each year.
** Due to curtailment in oil industry, year 1928.

Once the advantages of electric pumping had been demonstrated to the satisfaction of the oil men, lines were extended into all of the fields in the valley and in the adjoining oil region along the coast. The initial installation in the Coalinga fields in 1910 was followed by extension of service to the Taft, McKittrick and Kern River fields in August, 1911, and the Midway and Santa Maria fields in 1913.

Oil Field Service Practices

Study of the oil field operations and experience in furnishing this type of service soon indicated that types of construction different from those ordinarily employed for other classes of service would be required for the oil fields. The absolute necessity for service continuity indicated that a loop system served from two or more points and sectionalized every few miles with pole-top switches



Standard layout for three-phase, 11-kv. transformer structure for three 25-kva. or larger transformers for oil field installation.

would be most desirable. The transmission lines furnishing service to the fields are either 70- or 110-kv. circuits carried on wood poles or steel towers. To insure reliability of service duplicate lines are built to the various substations in the fields. Substations are mostly of the outdoor type equipped with all modern facilities for the protection and control of incoming and outgoing circuits. Switch and bus structures are of steel with bypass switches so arranged that equipment may be taken out of service for inspection and repair without interruption of energy flow. To correct poor power-factor conditions which are characteristic of some oil field loads, synchronous condensers are installed at strategic points in the transmission network serving the oil districts.

At substations the current is stepped down to 11.5 kv. for primary distribution to the various properties and leases. Secondary power distribution is at 440 volts, three-phase, supplied by banks of three single-phase transformers.

Rates and Metering

Practically all power used in the oil fields is billed under one of two schedules. Where operations are sufficiently extensive as in the case of the large companies, the operators own their own distribution lines and transformers and purchase their power on a wholesale basis. This schedule involves a 15-minute maximum demand with a charge of $230 for the first 200 kw. of demand per month, $1 per kw. for the next 300 kw. of demand and $0.90 for all in excess of 500 kw. of demand per month. The energy charge is 8.5 mills for the first 300 kw.-hr. per kw. of demand and 7 mills for all energy in excess of this amount. This schedule eliminates all peaks between 11 p.m. and 6 a.m.

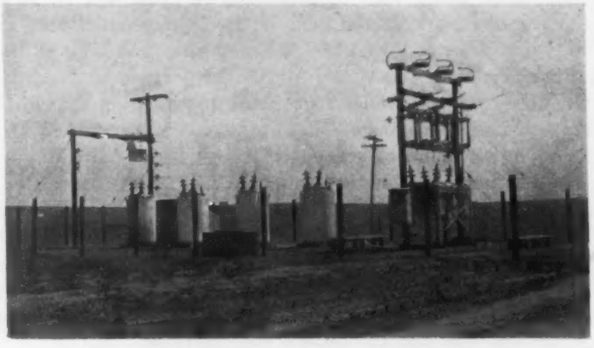
For smaller operations a special oil field schedule is in effect. This calls for a flat charge of 1.4 cents per kw.-hr. with a minmum charge of $1.25 per hp. of connected load per month. This minimum charge is based on the low rating of the motor, in most cases 10 or 15 hp.

A graphic demand meter is employed for metering consumption under the wholesale rate. Wholesale delivery is at 11.5 kv. with the single exception of one large completely electrified lease which takes energy at 60 kv. The regular metering equipment consists of two outdoor dry-type 11-kv. potential transformers mounted at the top of a pole at the point of delivery. A small meter house is set near the base of the pole in which is located the graphic demand meter.

Services under the other schedule are usually at 400 volts, three-phase, with an occasional service at 220 volts. It is necessary only to measure the kilowatt-hours for these installations. For services of comparatively small capacity, self-contained polyphase meters of proper current and potential ratings are employed. For larger capacities current transformers are used in conjunction with the watthour meter. This equipment usually is located in a meter box on the lower portion of the transformer structure.

Serving New Fields

In the early oil field electrification work the problem was one of convincing operators of the advantages of electric motor drive. Practically all of the fields were established and producing and since most of the expansion has been in the immediate neighborhood of these



Type of temporary substation built for wildcat operations.

older fields, the problem of supplying electric service has not been difficult.

It is in the newly discovered fields, however, that seemingly insurmountable obstacles must be met and overcome. Occasionally an oil company will request that a line be extended some distance to furnish power for wildcat drilling operations. Should the wildcatting prove up a new field, then the rush begins. The companies suddenly discover that they wanted service yesterday.

The now famous Kettleman Hills field in the western section of the San Joaquin Valley between Lost Hills and Coalinga is typical of this situation. Geologists had long been convinced that there was oil in this territory and upwards of 38 wells had been drilled at various times over a period of nineteen years with varying success. There had been one or two small producers of low gravity oil but these wells ultimately were abandoned. Then in October, 1928, the Milham-Elliott No. 1 well of the Milham Exploration Company blew in with a daily production of 4,200 bbl. of 60-deg. B. oil and 35,000,000 cu.ft. of gas from a depth of 7,236 ft. Kettleman Hills immediately was dubbed the "Wonder Field" and rightly so. Immediately the sales and construction forces of the San Joaquin Light & Power Corporation got busy. The

Aerial view of Kettleman Hills showing rough terrain and Milham Exploration Company discovery well in the center of the picture.

relationship between the power company and the Kettleman development is best shown by the following chronological story of the operations in this field:

Oct. 5, 1928—Discovery well blew in proving the field.

Oct. 7, 1928—Telegrams were sent by the power company to all oil companies notifying them that electric service could be made available.

Oct. 15, 1928—Plans and estimates were made for the construction of a 13½-mile, 11-kv. line from Coalinga to the vicinity of the discovery well.

Nov. 2, 1928—First application for service received, power to be used for drilling one well and lighting small camp.

Nov. 6, 1928—Construction of Coalinga-Kettleman line started. Construction crews were terribly handicapped by rough terrain, lack of roads and torrential rains.

Dec. 7, 1928—Line completed and tested out. Oil company's equipment not ready for service.

Dec. 12, 1928—Lights supplied to small camp.

Dec. 16, 1928—Power supplied to electric drilling outfit having a connected load of 310 hp.

Dec. 16, 1928, to Jan. 15, 1929—Two more electric drilling outfits connected and applications received from others for service.

Jan. 15, 1929—Plans and estimates made for construction of 70-kv. transmission lines from Tulare Lake substation to a new substation in Kettleman Hills having an initial capacity of 4,500 kva. Plans also made for construction of additional distribution feeders.

Feb. 2, 1929—Construction work on substation and lines started.

March 15, 1929—Work completed and substation put in service.

April 30, 1929—Connected load in Kettleman Hills 4,370 hp. in power and 125 kw. in lighting from 66 customers.

Aug. 1, 1929—Line completed to serve Standard Oil pipe line station near Kettleman City with 100 hp.

Aug. 12, 1929—Connected load at Kettleman Hills: 6,586 hp. in power and 210 kw. in lights, serving 36 power consumers and 68 light consumers.

A few incidents will illustrate some of the difficulties encountered in the construction work involved in getting service to Kettleman Hills. One line crew killed seven rattlesnakes in one day. Grades ranging up to 35 per cent were encountered. There were no roads. The broken character of the terrain is shown to some extent by the accompanying aerial photograph. The fact that

a meter reader must travel 4½ miles to get from one derrick to another only 600 yards away (air line distance) to read the two meters further illustrates the rough character of the country.

Future of Oil Field Electrification

Now what is the future of oil field electrification in the territory served by the San Joaquin company? Officials of the company are certain that a greater use of electricity will develop in the oil fields for drilling, for the operation of field pumps for gathering the oil into field storage tanks and finally for the operation of main pipe line pumping stations. The latter application is one that has been receiving considerable study. Small success to date has been due to the present large investment in steam pumping stations, the shut-in condition of the San Joaquin Valley oil fields and finally to the low gravity of much of the oil flowing through the lines which requires steam heating to facilitate flow.

The Kettleman Hills substation with a capacity of 4,500 kva. and the incoming 70-kv. line were built in 42 days.

However, deeper drilling is developing lighter oils which can be transported without heating through the lines with electrically operated pumps. Future development possibilities of the fields indicate that a greater number of pipe lines will be needed to transport the oil and it seems certain that pipe line pumping stations of the future will be electrified.

Discovery well of the Milham Exploration Company in Kettleman Hills.

Present success with electric drilling presages still further use of the electric motor, particularly in deep territory. Drilling costs show much in favor of electric power and the development of diffential drives makes possible much straighter holes than possible with ordinary rotary drilling equipment.

Despite the quantity of natural gas that is available, it seems certain that future oil camps will be electrified, utilizing electric bake ovens, refrigerators, air heaters and water heaters. Many camps recently constructed already have been equipped with these modern appliances. Convenience and low fire hazard have been recognized as definite advantages to be derived from the use of this electric equipment.

Further discussion of the present and possible future developments of oil field electrification will be the subject of a succeeding article to appear in an early issue.

UTAH Natural Gas Pipe Line *Is Electrically Welded*

ELECTRICITY played its part in the project of bringing natural gas from the Rock Springs district of Wyoming into Ogden and Salt Lake City, Utah. A complete electric weld job on this 277-mile gas line is indicative of the increasingly general acceptance of arc welding processes in the field as well as in the factory.

Of the total mileage of this new gas line, 200 miles is of 18-in. pipe and the balance of 16-in. pipe consisting of a 42-mile branch to Ogden and a 35-mile branch to Salt Lake City. All of the pipe used is of arc-welded manufacture produced in 30-ft. lengths and designed with bell-and-spigot ends with a specially rolled "welding dam" at the spigot end to facilitate field welding. Each length weighs approximately 1,600 lb. and it was necessary to use a tractor to drag some of the lengths into position after they had been delivered by means of trucks as near as possible to the scene of installation.

In line with customary practice in pipe line construction, sections of varying lengths depending upon local topography were assembled and lined up on timbers along the trench. In this lining-up process the spigot ends of the pipe lengths were inserted in place in the bell ends and the entire section thus formed was leveled by shoring up with timbers. Immediately a section was leveled each joint was tack-welded promptly to keep the section

intact, a step necessitated by the extreme temperature variation which in the course of a 24-hour period would cause appreciable movement within the length of the section.

A roller cradle, shown in one of the accompanying illustrations, materially facilitated the electric welding

A grade of 60 per cent in an electrically welded gas line. Sections that comprise this portion of the line were arc welded on top of the hill and then lowered into position.

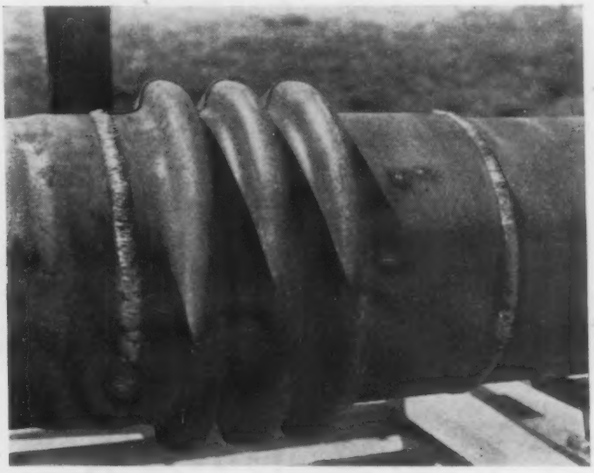
operation. This cradle device consisted of four steel rollers mounted in pairs on a welded channel base. One was placed on the shoring under the pipe adjacent to each joint. Thus the entire section rested on rollers enabling it to be turned as the welding operation progressed on each successive joint, permitting all welding to be done on top in a convenient and expeditious manner.

To obviate pin-hole leaks each joint in the section was double arc welded, two separate beads being run around each joint. The first, or burning-in bead was welded with 3/16-in. electrodes, placing an average of ¾ lb. of electrode metal on each 18-in. joint. The second, or finished bead, was welded using ¼-in. electrodes, placing approximately 1¾ lb. per joint in making the finished weld on an 18-in. pipe. In this field welding job the average speed of welding ranged from eight to twelve joints per man per day.

As each section was completed it was placed on skids over a previously excavated trench and welded into the line. Since it was impossible to turn the pipe for this operation it was necessary for the operator to weld around the pipe as it lay, and for this operation the average speed varied from six to eight joints per operator per day.

To care for expansion and contraction in the finished line, caused by temperature changes, a special type of all-steel expansion joint was welded into the line at intervals. A typical expansion joint is shown in one of the accompanying illustrations which also shows examples of completed arc-welded joints.

The major portion of this 277-mile gas line was welded by the Uinta Pipe Line Company, using ten 300-amp. gas-engine driven Lincoln "stable arc" welding outfits. These



Type of expansion joint used, also illustrating completed arc-welded joints.

gas engines were of the six-cylinder type, utilized by the manufacturer in connection with the 1,500-r.p.m. generators to eliminate vibration. Each generator was direct-connected to its engine through a flexible coupling and both units of a set were mounted on a structural

Making a "firing line" weld on a windy day, a tarpaulin forming the windbreak. Note rollers under pipe at each joint to facilitate turning the section during welding process.

steel channel base. Each welding outfit was mounted on a vehicle which could be drawn either by a team of horses or by a tractor.

The success of the venture seems to augur well for the further extension of electric welding processes into the construction field.

The HOUSEWIFE'S Attitude Toward Appliances and Wiring

Results of the J. Walter Thompson Company's Consumer Survey Conducted for the Industry Sales Conference

Conclusions from the Fact-Finding Customer Survey

1. *The American home offers a large undeveloped market for wiring, electrical appliances and increased use of electric current.*
2. *There was no evidence that the housewives interviewed had ever been approached with any plan to introduce into the household the use of electricity in a comprehensive way.*
3. *The appliances most aggressively advertised and merchandised had by far the widest distribution, pointing very definitely to the way by which the market can be cultivated for much larger purposes.*
4. *Inadequate instruction to educate the housewife in the effective use of the appliances she possesses is generally reflected in many abandoned appliances found in the home.*
5. *The absence of a rate graduated to volume is not only discouraging to the acquisition of more appliances but productive in many cases of strong feeling against the central station.*

JUST what is the public attitude toward further electrification of the home? What is the present degree of home electrification? These are some of the questions answered by the "Consumer Survey" conducted by the J. Walter Thompson Company as the outcome of plans developed by the Industry Sales Conference for a national program of advertising and sales promotion to be undertaken by the industry in the interests of domestic electrification. As the outcome of the survey and various conferences, national advertising copy, supporting literature and a program of local tie-in is being prepared. It is anticipated that the campaign will be in full swing in 1930.

The "Consumer Survey," results of which have just been released, provides the basis for the merchandising and sales promotion campaign that will follow. The major purposes which this survey set out to accomplish were:

1. To learn the adequacy with which typical American homes are wired, as gaged by the minimum Red Seal standard of the Society for Electrical Development.

2. To find the number and nature of electrical appliances in the typical household.

3. To study consumer interest and appreciation of the value of electricity.

4. To determine ways and means to develop a larger market for electricity in the homes of America.

Thus the major objectives of the investigation were to find out what were the conditions, electrically speaking, in the home and the state of mind of the housewife toward the use of electricity. The survey as conducted was based upon the principle that a cross-section well chosen reflects the conditions throughout the country and the results established by it can be accepted as a basis of operation for the country as a whole. Cities of different population groups representative of every geographic division of the country were studied.

Personal interviews with housewives and a carefully prepared questionnaire were the methods adopted. The questionnaire necessitated the investigators taking an accurate census of switches, convenience outlets, ceiling fixtures, wall brackets and appliances in every room of every home surveyed. Every class of home was studied. The investigation overemphasizes the owned homes as in the majority of cases apartment and tenements were closed to the investigators. Seventy-eight per cent of the homes visited were owned. Twenty-one per cent were new homes, 57 per cent were ten or more years old. Seventy per cent fell in the five to eight-room class.

Homes were divided into four classes ranging from those of persons of large income who maintained servants to those of day laborers and foreigners. Middle class homes received the most attention as it was felt that they represent, in the aggregate, the most important

group from the standpoint of amounts purchased and also in that they are the most susceptible to the influence of merchandising and sales promotional efforts.

Of all the homes investigated only 1.2 per cent were wired to Red Seal specifications. Of the homes which did measure up to these standards, all were owned by their occupants and half were found to have been built during the past five years. The dining room was found to be the most adequately wired room in the home with 49 per cent up to standard. The bathroom was the least adequately wired with only 5 per cent up to standard owing to the requirement of a baseboard outlet. The absence of convenience outlets accounted for most of the inadequate wiring. Except for the living room, nearly half the rooms had no convenience outlets whatsoever. The absence of switches was also marked in the majority of homes.

For the purposes of analysis electrical appliances were grouped int the following two classes in the survey:

Time and labor-saving appliances:. flat iron, vacuum cleaner, washing machine, sewing machine, refrigerator, range, mangle, dish washer, toaster, percolator, waffle iron and grill.

Health and comfort-giving appliances: portable lamps, fan, room heater, heating pad, water heater, ventilating fan, curling iron.

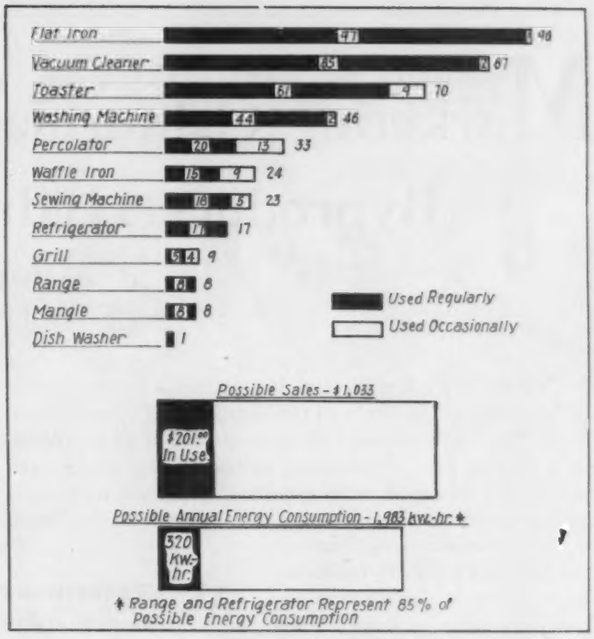
The survey showed that the typical home has six different kinds of appliances including the portable lamp. Careful analysis, however, revealed that only four appliances, the flat iron, portable lamp, vacuum cleaner and toaster, were in widespread use. The degree of appliance saturation found in the homes surveyed follows:

Fewer than five appliances	24	per cent
Five appliances	15	" "
Six appliances	14	" "
Seven appliances	13	" "
Eight appliances	11	" "
Nine appliances	8	" "
Ten or more appliances	16	" "

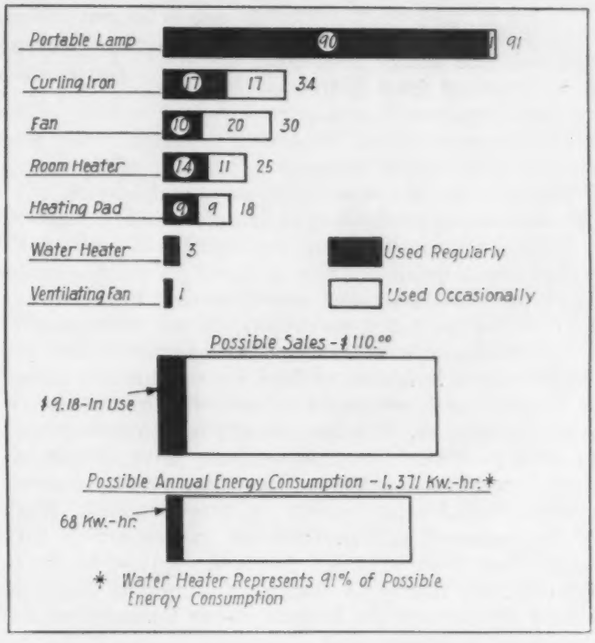
The two accompanying charts show the degree of saturation and the market possibilities for the various individual kinds of appliances.

In studying the question of wiring the investigators found that the average housewife was apathetic toward the value of a fully electrified home. Only 45 per cent of the women interviewed had made changes in the wiring of their homes since they were occupied and these were of a very minor character. Seventy per cent of the women interviewed stated that they were not interested in additional outlets or fixtures. Of the 30 per cent that felt the need for more wiring the majority desired more convenience outlets. Additional switches were second in importance. The two bed rooms, the dining room and the kitchen were the rooms in which most of the additional wiring was wanted. Fifty-nine per cent of the wiring desired was convenience outlets.

Of the women interviewed 46 per cent expressed the desire to do more housework electrically. Housewifes showed a much greater interest in appliances than they did in wiring. The consumers who expressed a desire to own other electrical appliances were asked to express a preference. Refrigeration was mentioned most frequently, a significant finding in view of the fact that the refrigerator is more extensively advertised than any other appliance.



Saturation and sales and energy consumping possibilities of time- and labor-saving appliances.



Saturation and sales and energy consuming possibilities of health- and comfort-giving appliances.

Consumers stated that initial cost is the chief reason for not doing more housework electrically. Cost of appliances and installation was given as the major sales resistance in 58 per cent of the interviews and cost of current in 16 per cent. Intertia and other miscellaneous reasons were given in the balance of the interviews.

Marketing California's Increasing Supply of Byproduct Hydro-Electric Power

By HAROLD K. FOX

Construction Engineer, Great Western Power Company of California.

EIGHTY PER CENT of the ultimate hydro-electric power in the State of California is yet undeveloped. The rate and mode of development of this remaining 6,770,000 kw. of potential hydro-electric energy are inextricably involved with political, economic and engineering problems which remain to be solved. As indicated on the accompanying outline map, practically all the potential water power in the state is included in some scheme of development, but much of it is indefinitely held up by adverse water laws, great distances from load centers and the increasing competition of steam-electric generation. However, hydro-electric energy produced as a byproduct from hydraulic projects constructed primarily for water conservation, irrigation, municipal water supply and flood control purposes is a factor of increasing importance and one which will have vital bearing upon the construction program of California's electric utilities.

WATER conservation and other public projects are introducing a disturbing factor into the electric power supply problem which must be given careful and proper consideration if the needs of California's industrial and agricultural growth are to be met adequately and economically. The author presents interesting data and constructive suggestions.

Since the conservation and development of California's water supply originally was initiated by private enterprise, the term "byproduct power" as used in this article is intended to refer specifically to all hydro-electric energy produced by hydraulic projects primarily designed for municipal, irrigation or flood control purposes as well as other projects not owned or controlled by the electric service companies. It is the aim of this article to attempt to show just what the true economic value of this byproduct power is, and to outline some of the economic problems which arise incident to its development. Much of the technical data incorporated in this article have been taken from a report prepared in 1928 by F. E. Bonner, then California District Engineer of the U. S. Forest Service and the Federal Power Commission, and due credit is hereby given.

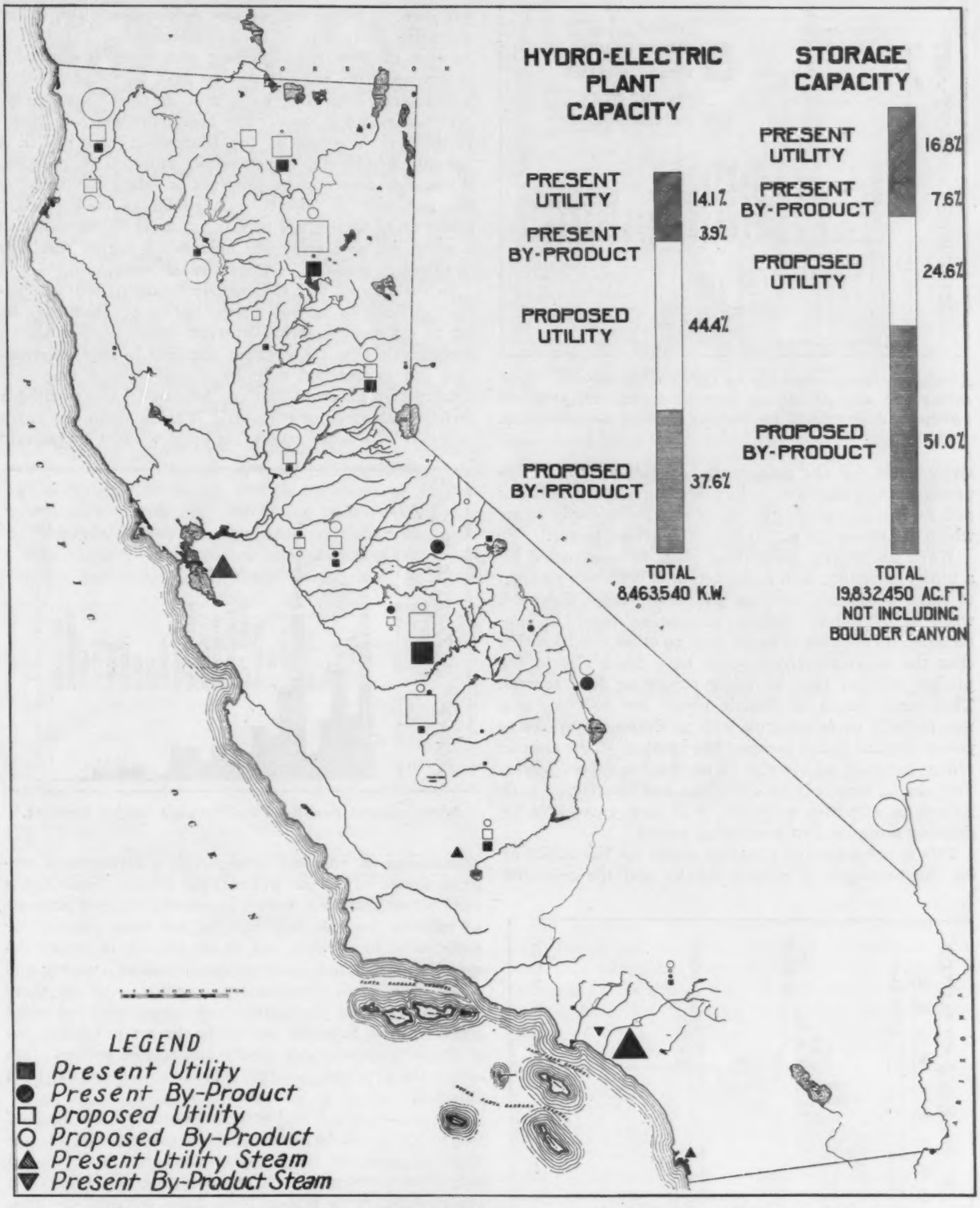
Admittedly in the interests of the maximum utilization of natural resources, all electric energy that can be obtained as a byproduct from a water supply or a flood control project should ultimately be developed. The actual effective economic value of a byproduct hydro-electric plant in general is less than the value of a primary hydro-electric power development of similar size and proximity to load center. This obviously is true since the amount of electric energy available from a byproduct plant is subject to control at all times not by the power demand that normally would fall upon such a plant, but by the demand for water if the project be a municipal or irrigation development or by the permissible discharge from the reservoir if the project be a flood control work. Consequently it is a grave mistake to place too great an economic value upon a byproduct plant or upon its output.

From the electric utility point of view there are two vital questions which must be answered in order to determine the real value of the public project: First, just what is byproduct power worth? and second, how will its absorption into a utility transmission and distributing system affect the construction program upon which the utility already is committed?

Naturally this is a much debated subject having many ramifications and upon which there is a wide divergence of opinion and a great general misunderstanding on the part of the public. Because of its very nature as a byproduct project, such a public undertaking necessarily is an unreliable source of electric energy as already has been pointed out. It is usual to arrive at a value of byproduct power by comparing all of its production costs, including transmission cost, against the cost of steam-electric generation. To do this the byproduct hydro-electric output of a given plant properly is divided into two classes, primary and secondary power.

Primary power is assured power, just as reliable and readily available as steam-electric generating capacity of equal amount. Primary power may be defined further as being that portion of the output capacity of a byproduct plant that is immediately available to meet electric power demands. For this class therefore the value per kilowatt-hour delivered at the load center is the same as the value per kilowatt-hour delivered at the load center from a steam-electric generating plant or from other projects primarily hydro-electric. Invariably the output of such plants would be purchased at the plant and transmitted varying distances to load centers over the lines of the utility. Threfore the value per kilowatt-hour of power generated by no two plants is alike, since transmission costs vary directly with the distance of transmission and constitute an important factor in the determination of cost per kilowatt-hour delivered at the load center.

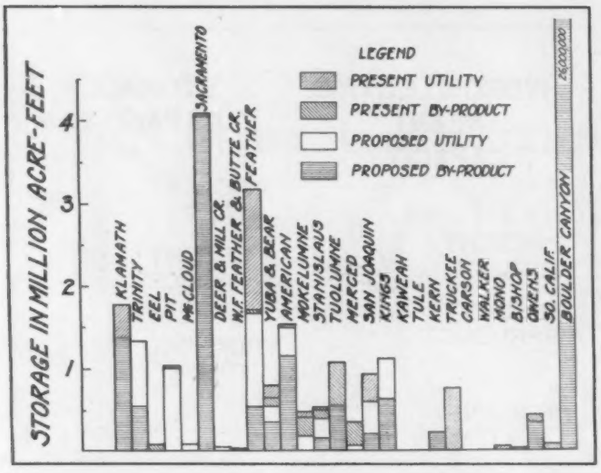
Secondary power would be that portion of the output capacity of a byproduct plant that cannot be relied upon to meet electric power demands, and which can be used only when, as and if available. Obviously such power is worth somewhat less than the value of fuel that its use will save in a steam-electric generating plant, since its



Skeleton map of the State of California showing graphically the location and extent of present and proposed power developments.

erratic availability makes it usable only by shutting down primary generating units or, in other words, shutting down generating units producing assured power.

Since the general public is completely unacquainted with most of the economic factors entering into the cost of electric energy delivered at the consumer's meter, the public naturally is inclined to be impressed by the apparent value of byproduct power at the power house on the basis of the rate per kilowatt-hour which it pays at its own meter. Thus it may be understood why it is rela-

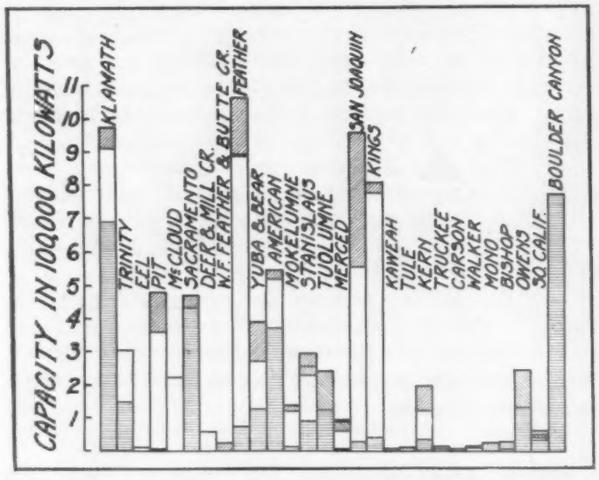


Available storage capacity on California's streams, indicating the present utility, present byproduct, proposed utility and proposed byproduct storage developments.

tively easy for the proponents of publicly-owned byproduct power plants to gain public support by omitting and failing to include the other and more costly items which determine the actual cost of delivered power.

When an electric generating plant is constructed by a utility company, such construction is definitely planned to meet a definite growing power demand. However, when a byproduct electric generating plant is constructed, its erection is based upon no other consideration than the hydraulic needs which have given rise to the project whether they be water supply or flood control. Thus large blocks of electric power are suddenly and unexpectedly made available with no definite reference to power demand and it becomes the problem of the electric utility company to attempt to absorb the excess power. This can be done only by curtailing and interfering with its own construction program, or in some cases even by shutting down its own generating plants.

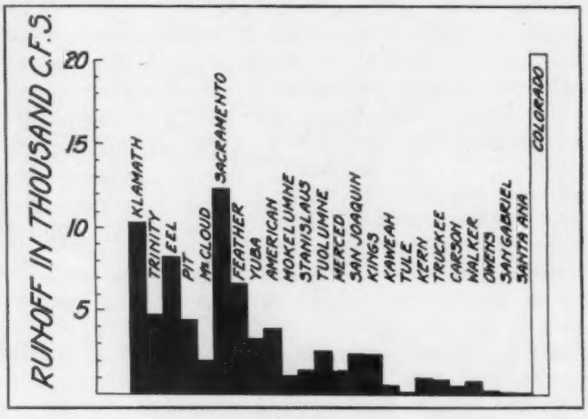
This is not a healthy situation either for the utility or for the consumer of electric energy and the resulting



Total available generating capacity of California streams, indicating the extent of present and proposed developments, both utility and byproduct. The legend is the same as for the preceding illustration.

iterference with the utility's construction program may add directly to the cost of new developments and to the operating charges on existing developments. This is true because the power development and water conservation programs of the various utilities have been laid out on a well-planned long-time basis and in most cases costly preliminary work already has been done which is amply justified if it serves as the foundation upon which a definite step-by-step construction program is pursued. When this construction program is interfered with by the necessity of absorbing large blocks of byproduct power all of this initial investment must lie dormant for a prolonged and originally unexpected period resulting in direct increase of costs as already mentioned.

In the face of this the electric utility finds it exceedingly difficult to lay out a construction program even as far as six months ahead, whereas experience has shown conclusively that the greatest economy in new construction can be realized only by a well-planned long-time construction program that can be carried along without unduly high speed or pressure. It takes about two years to construct a large generating plant without excessively



Mean annual runoff of California's major streams.

pyramiding the cost and consequently a development program should be laid out well into the future. Some plants built a few years ago were excessive in cost per kilowatt of capacity because they had had not been planned for sufficiently in advance and sharp growth in power demand required rush construction instead of a slower and more economical construction schedule. All of these factors are most thoroughly and completely overlooked when political interests set out to convert public opinion to the support of water supply and related projects into which the byproduct electric generation scheme has been injected.

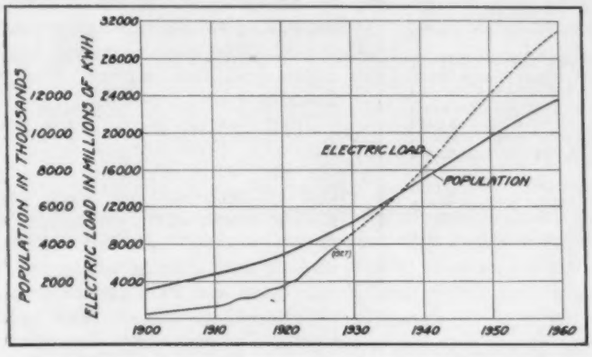
If available water and power resources of the State of California are to be developed most economically for the greatest good for the greatest number, a well-planned long-time co-ordinated construction program based upon engineering facts rather than upon political hysteria must be inaugurated.

Perhaps the greatest byproduct power problem facing the electric utilities in California in the near future is the proposed Kennett project on the upper Sacramento River. This project is the most feasible unit of California's much discussed "State co-ordinated plan," but there are very closely related and serious problems which affect materially the actual economic benefits of this

great project to the public at large. The Kennett reservoir would be one of the largest in the state with a capacity of approximately 3,000,000 acre-ft. It would involve a dam 420 ft. high and a project cost estimated at $70,000,000. Original estimates placed the electric generating capacity of the Kennett project at 320,000 kw., but these figures have been revised downward to 275,000 kw., with another 100,000 kw. possible from Iron Canyon with its 1,120,000 acre-ft. storage.

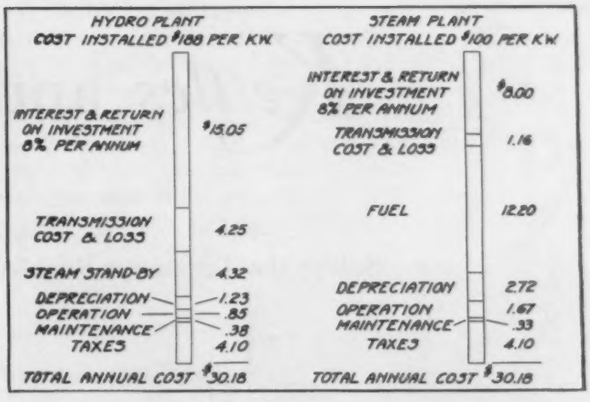
Here is an immense block of power which would require at least five years to absorb and which is 300 miles from the nearest load center. The only place for this energy to go is into the area already served by two northern California electric service companies, whose lines would have to carry the power. Both of these companies already have enormous resources partially developed on the Pit and the Feather Rivers at the same distance from the load centers. If the step-by-step development program already embarked upon on these two great rivers is to be interfered with and held up more than five years because of the necessity of absorbing power from the Kennett project, the resulting cost naturally must be borne by the consumer of electric energy and will directly affect the true value of any power available from this byproduct development.

In a State bulletin treating the question of the power value of this project, an exhaustive and able work pre-



Estimated growth of population and electric load in California.

pared by Lester R. Ready outlines three different methods of arriving at an estimation of the value of electric power from this project. By comparison with the costs from other hydro-electric plants, Mr. Ready arrived at a figure of from 2.7 to 3.3 mills per kw.-hr. at the generator switchboard. By comparison with steam costs the figure rises to from 3.45 to 3.68 mills per kw.-hr. at the generator switchboard, while the precedent set by existing byproduct power contracts suggests the value of 3.45 mills per kw.-hr. at the generator switchboard. Mr. Ready's analysis is concluded by the suggestion of 3.45 mills per kw.-hr. as a probable value of power at the Kennett generating switchboard. This, however, is too high because, as has been pointed out, byproduct power is worth actually less than primary power produced by generating plants of the electric utilities, byproduct generation not being as flexible to meet variations in load demand. Further, this figure (3.45 mills) does not at all reflect the true effect of the utility investment that would be compelled to lie dormant by the necessity of absorbing the byproduct power. The first figure, 2.7 to

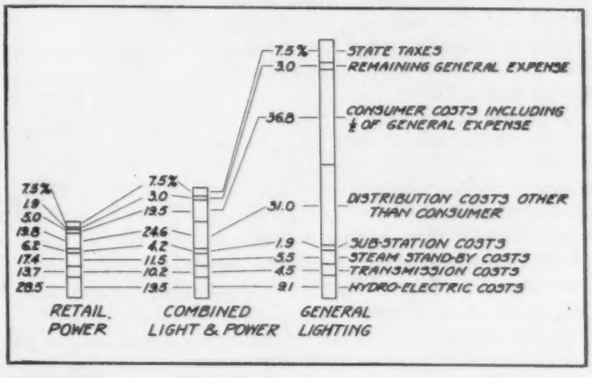


Relationship between the annual costs of equivalent hydro-electric and steam-electric generating plants.

3.3 mills per kw.-hr., is more nearly proper because it does reflect truly the relative cost of other hydro-electric power already definitely planned for.

Purchase of power also has financial disadvantages for which some adjustment should be made. Long-term contracts are dangerous unless provision is made for adjustment of price to meet changes in costs of generation by steam. In general, too much has been paid and is being paid for byproduct electric power, in view of the trend of generation costs in this area. Therefore, if the best interests of all parties concerned (including the consumer) are to be served, byproduct power contracts must be based upon a price which can be adjusted to compatibility with future generation costs. In determining the proper price, consideration also should be given to the possible effect of such byproduct power purchase upon the utility's rate base. Finally, where large blocks of byproduct power are involved, the development should be carried on in well planned relatively small steps instead of dumping huge blocks of energy on the market at one time.

If California's natural resources are to be developed for the best interests of the state and its citizenry as a whole, it is inevitable that byproduct hydro-electric power shall play an increasingly important role. The engineering and economic problems involved are in no wise insurmountable, but will require careful study, intelligent analysis and the closest co-operation between the utilities and the state and other public agencies interested.



Distribution of service costs for the three major classes of load served by the average utility.

Kettles and Eggs

EARLE ENNIS

Renowned for his San Francisco "Ferry Tales"

Solves the Tenacious Problems of Dishwashing

—of course if your family goes off in a corner to eat its eggs—

Mary's Worried Letter—

DEAR HAZEL:

John's family has just left for home after paying us a visit, and at last I can get around to answering your letter. For the past two weeks it seems I have done nothing but wash dishes. I counted up we used 161 separate articles for one meal! Even when there are just the three of us the task seems endless, and many a time I have missed going out with John just because there were the everlasting dishes to do. Is there anything to do about it?

What do you do about dish towels? I don't believe they are really sanitary, but dishes don't seem clean unless they are rubbed. What makes the soap so dreadfully sticky?

What do you do about kettles? I think the mush kettle in the morning is the very worst —that is, next to the frying pan and the roaster. How do you keep them shining? And burned kettles! Mine always stick afterwards, even though I work and work to get them clean.

The whole family ate eggs every morning for the two weeks and I never knew they could make so much trouble. How do you get egg out of corners and how do you keep your silver bright, short of daily polishing? Speaking of polishing silver, what do you suggest? We have some of the old-fashioned embossed kind.

You are always so practical. Can't you give me some short cuts? Or isn't there some way of getting out of the job altogether?

This is no letter, but a fair sample of my present thoughts. Advice will be appreciated.

Yours, with my hands in the dishpan,

MARY.

EDITOR'S NOTE—*The letter reproduced in the box at the right was made the basis of a contest in a recent issue of P. G. and E. Progress. The reply which contained the most unique ideas, bar none, was that of Earle Ennis, which follows.* ELECTRICAL WEST *suggests that both Mary and Earle get an electric dishwasher and live happily ever after.*

DEAR *worried, anxious, perturbed Mary*:

Don't let this dish-washing thing drive the artificial roses from your cheeks. It is really quite simple. A few suggestions may lighten your labors, save you wrinkles and double chins, not to mention social wattles. We give them freely to help preserve your domestic happiness.

Take kettles, for instance. There is nothing to cleaning a kettle. Get a small, strong, easily laundered poodle. Tie his feet together. Soap him thoroughly. Then, with the kettle half full of warm water, hold the poodle by the feet and slosh him around and around in the kettle. He is the equal of any wire dish-rag, and in addition you do not have to dip your hands in the water. A well-bred poodle will really enjoy the work and will wiggle food loose that otherwise sticks to the kettle.

Now as to keeping egg out of corners: always insist that your family eat in the middle of the room. Besides a really expert family will eat eggs out of the shell. Of course, if you have married into a family that goes off in a corner and eats its eggs, your task is a bit more difficult. But approach it in a bright, cheery spirit. Give thought and determination to it. You have something to work for. You have no idea what a spirit of unity abounds when people sit right up to a table in the middle of the room and munch their eggs. Try putting settees and bookcases in the corners so that eggs cannot be eaten there.

Try a Swedish massage for drying.

The problem of keeping silver bright is too simple for words. Buy a quantity of silverware at the five- and ten-cent store. Insist on solid silver, not the plated kind. Throw it away after each meal. This avoids the constant scrubbing of stained knives and forks. The cost is really very little and the service always looks new and fresh.

Dish towels, MARY, are not sanitary. You are quite right. On such rare occasions as you find it necessary to wash the dishes, stack them neatly in a drying rack. Then, holding the rack in both hands, go into the back yard and walk up and down slowly, letting the air blow over them. The dishes will dry themselves. There is nothing like making a dish dry itself. It develops firmness of character in the dish, strength of purpose, tenacity—all those qualities. Never permit a wet dish to impose on you. Be firm. You'll see!

The simplest way to escape washing dishes altogether is to cook everything in one pot. Stew is a good dish for this purpose. Put it all in one pot. After dinner, take the pot into the yard and turn the hose in it. Throw in the poodle if the food sticks. Then by serving on wooden dishes which can be burned in the fireplace afterward all worry and work is eliminated.

You mention the problem of keeping the bottoms of kettles and pans bright. This is a hard one, but we have worked it out, Mary, we have worked it out. Take a good, strong can opener. Cut the bottom out of the pot or pan. Take it into a machine shop and hold it against a buffer wheel until it has a high polish. Then shellac it and put it away. Weeks afterward you may

take it out and the bottom will be clean and bright. This is an old Swedish trick.

There is no way of getting out of washing dishes altogether, Mary, unless you wash them one at a time. You might do a few cups today and a plate or two tomorrow. Don't worry. Heaven's above! The world is full of dishes. Be deliberate. Smash all you can. Drop others in the garbage. Leave some in the yard for the cat. If you are adroit, you can get rid of all your dishes in a week. Then eat out, and your problem is solved.

These are just a few surface impressions to help along. Try them out, Mary, and if they work, let me know. I hate washing dishes myself.

Yours, wearily,

EARLE ENNIS.

Sound Device Gives Flexible Traffic Regulation

SAFETY for traffic with no unnecessary delays is the feature of a new traffic signal control device which actually places the control of traffic signals in the hands of the traffic itself. With this equipment, main-highway or "arterial" boulevard vehicular traffic is automatically given continuous right-of-way over intersecting thoroughfares except when vehicles or pedestrians at the intersecting thoroughfares may wish to cross or enter the highway. Motor vehicles and pedestrians desirous of crossing or entering the main artery may themselves operate the signal system to obtain the necessary right-of-way, thus interrupting main traffic when this situation exists and at no other time.

The control for vehicular traffic is actuated by the sound of the automobile horn operating through a microphone pickup designed and arranged to be responsive only to signals from traffic approaching the main highway from the intersecting thoroughfare. For pedestrian control a push button located on a pedestal at the curb of the highway sets in motion the signal-changing mechanism the same as does the sound impulse from the automobile horn.

Operation of the equipment is simple and definite and cares for fluctuating volumes of traffic with agreeable flexibility. Approaching a main traveled artery where signals are controlled by this new device, a motorist in the cross street comes to a stop in response to the red "stop" signal light that is set against him and sounds his automobile horn as a signal indicative of the fact that he wishes to cross or enter the main highway. Immediately a sensitive microphone inside the sound collector mounted at the curb (either on a special pedestal or on an existing standard or pole) picks up the sound, converts it into an electrical impulse and transmits it by wire to the nearby control box through which is placed in operation the relay mechanism for changing the signal lights. Immediately upon the sounding of the motorist's horn an amber light appears in the lens adjacent to the red light, indicating to the motorist that his signal has been registered. A moment or two later after a brief "caution" period, giving approaching main highway traffic an opportunity to slow down, the red "stop" signal appears against the highway traffic and the green "go" signal indicates to the motorist that the right-of-way is his. The sequence of operation for pedestian control of course is just the same.

After a predetermined interval the signal lights automatically revert, giving clearance to arterial traffic and halting traffic on the intersecting thoroughare. An immediate repetition of horn signals from the intersecting street will not cause immediate change in signals since such an operating possibility would itself result in serious delay to the main highway traffic. When the traffic signals first shift back to a clearance for main highway traffic after having given the right-of-way to the intersecting street, a definite predetermined timing cycle controlled by the sound-operated device must be completed before the signal may again be set against the highway traffic.

Sound-operated traffic signal control equipment at Burlingame, Calif., highway intersection.

One of the first actual installations of this traffic-operated signal is at the intersection of Broadway and the Peninsula Highway in Burlingame, Calif., a few miles south of the City of San Francisco. The traffic situation there is such that a standard, automatic type of traffic-signal timer is not satisfactory, due to the extremely heavy highway traffic and the variable amount of Broadway traffic entering or crossing the highway.

In the Burlingame installation the equipment consists of four General Electric Novalux post-type signals mounted on Union Metal standards on the far right-hand corners of the intersection.

Electrical West

C. T. Hutchinson, *Editorial Director*
G. C. Tenney, *Managing Editor*

Court Decision Points a Moral

THE DECISION of the court in the case of Merchant and Evans vs. Philadelphia Electric Company on the question of power company merchandising has created many ripples in the industry since it was handed down in June. Dealers have expressed dissatisfaction and utility men, in many instances, have become complacent.

It is true that the court held that not only has the central station a right to merchandise appliances, but that it is the duty of the utility to supply its customers with devices that will permit enjoyment of the conveniences to be obtained through the use of electric current. However, the decision does not in any fashion cuntenance or justify power company merchandising practices that are uneconomical or unethical or that set up unfair competition with the other electrical appliance outlets in a community. Such practices have been and will continue to be cause for friction between power companies and dealers.

Active leadership by the central station in appliance merchandising along strictly ethical lines is a desirable stimulant to sales that every dealer will welcome. Unless such a sound merchandising policy is pursued there will be many more Philadelphia cases.

A.C. Radio Receivers Are Electrical Appliances

THE PUBLIC has accepted the alternating current radio set. Now will the electrical industry accept the a.c. receiver as an electrical appliance? In the past there has been some justification for the "hands off" attitude of the industry, particularly after the mistakes, misfortunes and losses of four or five years ago. However, there are no grounds for such an attitude today.

The industry cannot ignore the possibilities that the modern radio set presents. From the standpoint of the central station an a.c. receiver represents a load with a low power demand and a highly desirable long-hour period of use with an estimated consumption of more than 100 kw.-hr. annually. The large potential market—approximately 80 per cent of the wired homes of the country are not equipped with modern sets—and the merchandising profits obtainable, make it a desirable device for both electrical dealer and central station alike. Moreover, in the a.c. set the problems of service and installation have been reduced to a minimum.

With radio accepted as an electrical appliance the power company and electrical dealer have distinct merchandising advantages in the way of consumer contact and good will that are not available to the music or department store. It would appear that radio presents an immediate opportunity that should not be ignored.

A Market That Demands the Concerted Action of the Industry

ELSEWHERE in this issue will be found an abstract of the results of the J. Walter Thompson survey, nation-wide in its scope, for the purpose of determining the market for electrical appliances. This survey was undertaken at the instance of the Industry Sales Conference and has required nearly a year for compilation and analysis.

Everybody in the industry has known in a vague sort of way that the market was scarcely scratched, as the survey shows, and that something ought to be done about it. In the Far-Western states a much better job of sales promotion has been done than in the Middle West and East, but this difference is merely one of degree. So little really has been done, so much remains to be done, that the survey should have a salutary effect upon the conscience of that portion of the industry that thinks and acts. The average domestic consumption of electrical energy is about one-fifth of what it ought to be, assuming a reasonable utilization of the benefits of the electrical servant, and in consequence the appliance sales per domestic customer are proportionately scant.

It really resolves itself into a battle for a larger share of the consumer's dollar. It is a competition of the electrical labor-saving appliance with cigarettes, cosmetics, automobiles, and the fashion motif in clothing. In conducting this battle it is conspicuously evident that the most potent weapon of electricity's competitors—advertising—has been sadly lacking in the war equipment of the electrical man. Not that we mean to depreciate the splendid work of so many manufacturers, but the interests most concerned, those that stand to profit most, the central stations, have been content with a meager use of local newspaper space and perfunctory copy.

It has been recommended, as a result of the survey, that a national advertising campaign be prepared for the purpose of carrying the story of the

domestic electrical servant into every home, to bring about what is technically termed electrical consciousness in the mind of the housewife, to pave the way through the elimination of sales resistance for the advent of the individual efforts of local advertising and salesmen for the power companies, manufacturers and retailers of all classes.

It is primarily a problem of the industry as a whole and calls for united understanding and concerted action.

Light Recognized After Fifty Years

IRONY tinges the announcement that Stanford University will include as one of its major branches of electrical curricula that of illuminating engineering. It will confer degrees upon students who first meet the requirements of the general engineering four-year course and who complete two extra years' special study of illumination. Thus illumination takes equal rank with the subjects of power transmission and distribution, power generation, and communication.

It is a little strange that lighting, the original purpose for which electricity was developed, should wait fifty years for this recognition. Yet in this significant event there is cause for additional rejoicing at this time of Light's Jubilee. Advanced to a place of dignity and sound engineering, light in the next fifty years should make as remarkable progress as it has in this first half century.

Light is coming into its own, even if it has taken fifty years.

The Tax Exemption Argument Is Gone

TAX EXEMPTION has been one of the principal arguments advanced by advocates of public ownership. By eliminating taxes, which in the case of the average electric utility approximate 10 per cent of the gross revenue, it has been possible to show favorable bookkeeping savings for the public ownership project. But now a decision of the Eighth District United States Circuit Court of Appeals casts an entirely new light on the subject of taxation. The court has held that the State Bank of North Dakota, one of the disastrous socialistic undertakings of that commonwealth, is liable for full federal taxes.

In making this ruling the court laid down the principle that it is only when performing a strictly governmental function that a publicly owned and operated institution is entitled to exemption. While not attempting to define the limits of proper governmental functions, the court has ruled that, in the matter of taxation, when government enters the realms of private enterprise it must do so on an equal footing with private business. Thus the insurance, banking, and public utility operations of various states become liable for federal taxes.

While the decision applies only to levies by the federal government, it is conceivable that it will be interpreted to apply to state taxes on municipal undertakings. Should such an interpretation be made, it would prove to be a strong deterrent to proposals to inject government into the realms of private industry.

Wiring Hotels for Conventions

NEVER is a building's electrical system so taxed as that of a hotel during a present-day convention. In the good old days when conventions consisted of speeches and a banquet there was need for nothing but dim lighting in the auditorium—to save the speaker the pain of seeing all the delegates asleep.

But in these days of the highly dramatized and energized convention-show the requirements are more than any commercial hotel now can fulfill. Thus when an electrical convention is held any hotel, no matter how modern otherwise, is simply years behind the times.

The day is at hand when hotels soliciting conventions should be made to realize that it is an electrical age to which they must cater. Purely from a good-business standpoint, such hotels should be prepared to offer electrical facilities in step with this new conception of conventions.

Answering the Gas Man's Argument

AFTER official studies and tests the gas man sums up his conclusions regarding the relative advantages of electric and gas ranges as follows: "While each range has some advantages over the other, the lower first cost, upkeep and installation costs of the gas range, with its lower operating cost and advantage in cooking speed, will probably always prove most practical for use in the average American home." To which the electric man might reply: "The economy, cleanliness, superiority of cooked food, safety, ease of time and temperature control and convenience, of the electric range are adding to its popularity and the time is not far distant when practically all cooking as well as other household tasks in the American home will be performed electrically."

Engineering Practice

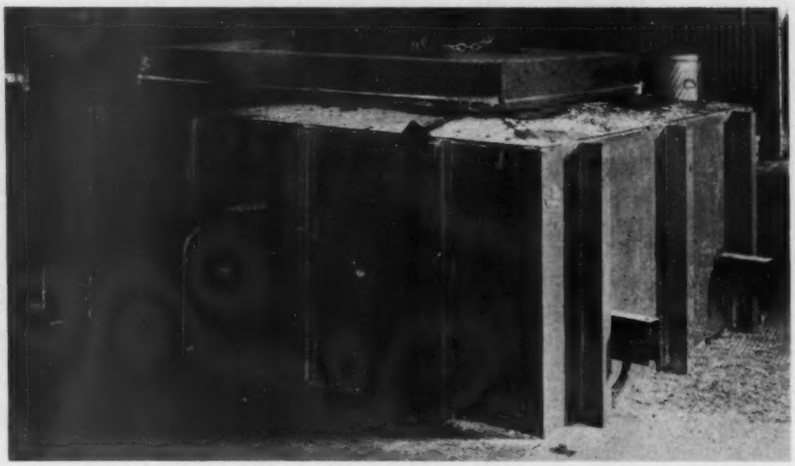
Electric Galvanizing Equipment Proves Its Advantages in Edison Shops

By A. D. IRION, Shop-Test Department, Southern California Edison Company, Alhambra, Calif.

AMONG the important advantages realized through the use of electric heat for a galvanizing pot, are:

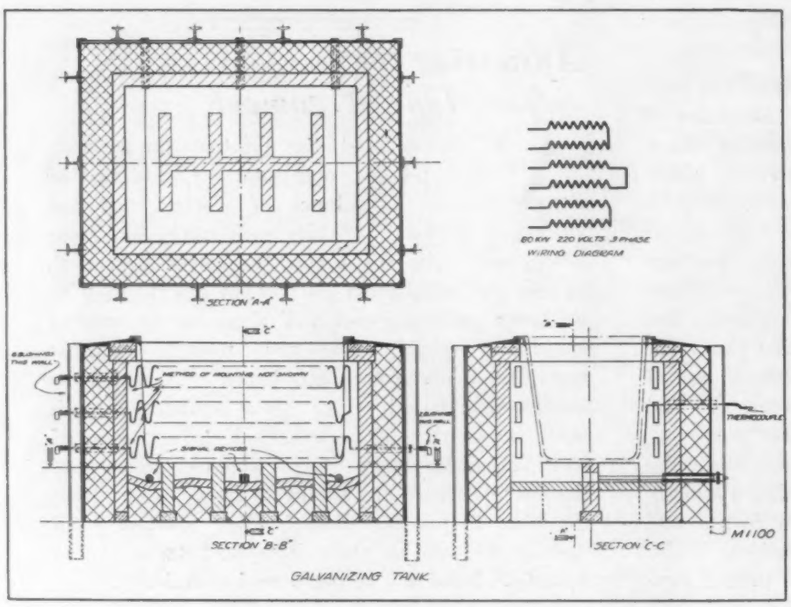
1. Reduced operating costs.
2. Improved quality of galvanizing.
3. Reduced immersion time.
4. Reduced labor costs.
5. Close regulation of tank operating temperature.
6. Improved working conditions.

These facts were ascertained by a three-day run on the new electric galvanizing tank installed at the Alhambra, Calif., shops of the Southern California Edison Company. This is a 3 x 5-ft. tank, 3 ft. deep inside, fitted with 80 kw. of 220-volt heaters and having a normal capacity of 16,500 lb. of zinc bath. The heating units are arranged for either three-phase Y or single-phase series connection and equipped with a Brown recording-control pyrometer which may be set to maintain any desired temperature. The connection scheme of the heating units permits the one set of units to be used Y-connected for operating conditions and series connected for over-night or standby operation.



Electric galvanizer in Alhambra shops of Southern California Edison Company. Reduced radiant heat losses permit operator to stand closer to his work and automatic temperature control permits his full attention to dipping. Insulating cap is shown in place.

To determine the commercial efficiency of the galvanizing tank the test was run under average shop conditions.



Sketch showing general design details of electric galvanizer pot.

The weight of each piece of galvanized material was checked carefully before and after immersion in the bath and these results were totaled and tabulated at the end of each day. (See accompanying table.) During the initial day of the run the tank was operated subject to the control of a thermocouple mounted in the heater compartment, but to gain a closer control and to determine accurately the temperature at which the best galvanizing could be obtained, the control of the second and third day was actuated by a thermocouple immersed in the galvanizing bath. The reading of the recorder was checked periodically against a thermometer immersed in the bath and a temperature differential of from 10 to 20 deg. F. was noted between the two methods of measurement. A study of the accompanying tabulation will disclose many facts which space does not permit to be enlarged upon.

As the maximum demand under normal heat control was approximately 82 kw., it was possible to determine the theoretical capacity under conditions when the heat would be on continuously. This is the manner in which the value given in item No. 11 of the accompanying tabulation was determined. From

TABULATION OF TEST DATA COVERING THREE-DAY PERIOD OF OPERATION OF ELECTRIC GALVANIZER UNDER AVERAGE SHOP CONDITIONS

ITEM	Feb. 18	Feb. 19	Feb. 20	Total	Three-day Average
Net weight of work (lb.)	6,026	5,172	5,539	17,735	
Weight of tools (lb.)	737	473	929	2,138	
Total wt. metal heated (lb.)	6,763	5,646	7,468	19,877	
Net work per hr. (lb. av.)	709	609	769		695
No. pieces galvanized	2,105	988	308	3,401	
Weight per piece (lb. av.)	2.86	5.14	21.20		5.22
Weight of zinc used (lb.)				1,860	
Weight of dross (lb.)				775	
Weight of zinc per ton of work (lb.)				210	
Calculated work per 192-hr. month (lb.)				133,500	
Estimated kettle capacity (lb. per month)				187,000	
Kw.-hr. consumed 8 a.m.—4.30 p.m.	510	450	490	1,450	
Kw.-hr. consumed 4:30 p.m.—8 a.m.	230*	180	180	590	
Kw.-hr. consumed 24-hr. day	740	630	670	2,040	
Kw.-hr. per hr. (8 a.m.—4:30 p.m.)	60	52.90	57.60		56.80
Kw.-hr. per lb. of metal galvanized	0.0845	0.0869	0.0750		0.0818
Energy cost (8 a.m.—4:30 p.m. daily)	$13.82	$12.20	$13.28	$39.30	
Energy cost (24-hr. day)	$16.09	$13.69	$14.56	$44.34	
Energy cost per lb.	$0.00267	$0.00265	$0.00228		$0.0025
Energy cost (one month calculated on P-12 sched.)				$408.50	
Man-hours labor	50.00	56.50	53.00	159.50	
Labor rate per hr.	$0.60	$0.60	$0.60		$0.60
Labor cost	$30.00	$33.90	$31.80	$95.70	
Labor cost per lb.	$0.00498	$0.00655	$0.00486		$0.0054
Labor cost per month approx.)				$894.00	
Cost of zinc per lb. of mtl. galvanized					$0.00804
Cost of acid per lb. of mtl. galvanized					$0.00364
Cost of salammoniac per lb. of mtl. galvanized					$0.00080
Total cost per lb. of mtl. galv. including labor, energy, zinc and chemicals					$0.02033

* Cover left off tank over night.

the radiation loss given when the tank was not in use it may be seen readily that the efficient operation of the tank depends upon the load factor (pounds per hour) and the number of hours of each 24 that the tank is in use.

The rate under which the operating costs were figured was a standard Edison Company schedule covering an installation of a maximum demand of 100 hp. or more.

Hp. of Measured Max. Demand	Cost per Kw.-hr. per Month per Hp. First 50	Next 50	Next 100	All Over 200
100-249	4.2	2.9	0.85	0.70
249-499	3.0	2.0	0.75	0.60

If other power equipment were used in conjunction with such a galvanizing tank even a better rate would be available than was used in the cost calculations of this particular tank.

During the early part of the test the material to be galvanized was immersed the same length of time as previously required with a gas-fired bath, an average of two minutes for each piece. Experience showed that this could be cut to 45 seconds with the electric galvanizer using an 850-deg. F. bath temperature. (Various other temperatures ranging from 800 to 875 deg. were tried and discarded.) Pieces so galvanized had a zinc coat thickness of about 0.002 in. which withstood successfully five dips of one minute each in standard copper sulphate solution whereas the standard test for such material requires that the work shall stand only four one-minute dips. Pieces so galvanized also were bent double without any evidence of peeling or cracking.

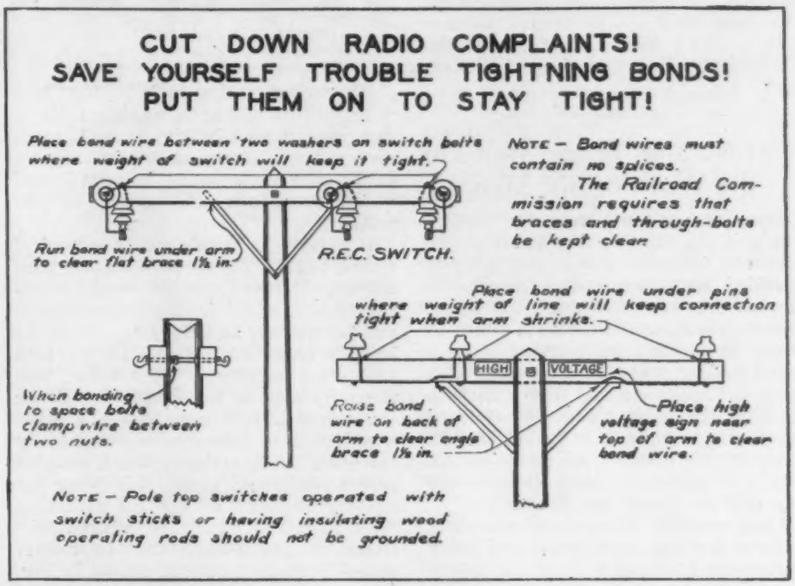
Another item of saving with this particular tank was in the matter of dross. With a gas-fired tank it was common to remove 1,000 lb. of dross each week, whereas initial experience with the electric tank showed a cut to less than one-half of this amount effecting in itself an appreciable saving in operating cost. Analysis of accumulated data indicates that the total overall cost of electric galvanizing is about half the cost of similar service from an equivalent gas-fired installation.

New Burners Improve El Paso Plant

Boilers at the steam-electric generating plant of the El Paso Electric Company are being changed over to operate either with gas or oil, according to A. C. Learmonth, chief engineer. The reconstruction program contemplates the installation of Peabody-Fisher wide-range combination burners in all boilers of the plant and involves also certain new furnace construction and some water-wall reconstruction.

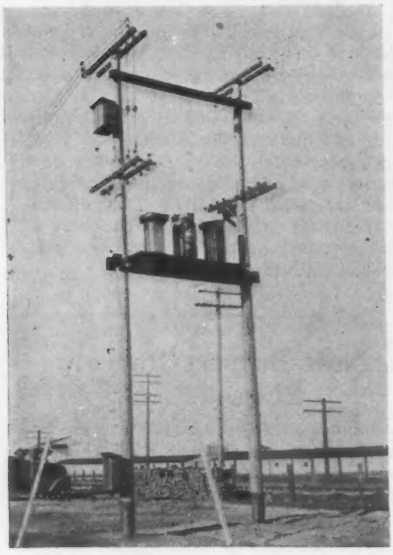
It is expected that operating efficiency and output capability both will be increased materially as the result of the new work.

Suggestions on Line Construction


CUT DOWN RADIO COMPLAINTS!
SAVE YOURSELF TROUBLE TIGHTNING BONDS!
PUT THEM ON TO STAY TIGHT!
Place bond wire between two washers on switch bolts where weight of switch will keep it tight.
Note — Bond wires must contain no splices.
The Railroad Commission requires that braces and through-bolts be kept clean
Run bond wire under arm to clear flat brace 1½ in.
R.E.C. SWITCH.
Place bond wire under pins where weight of line will keep connection tight when arm shrinks.
When bonding to space bolts clamp wire between two nuts.
HIGH
VOLTAGE
Raise bond wire on back of arm to clear angle brace 1½ in.
Place high voltage sign near top of arm to clear bond wire.
Note — Pole top switches operated with switch sticks or having insulating wood operating rods should not be grounded.

HAVING found the sources of trouble that had given rise to the few complaints of radio interference that could be traced justifiably and definitely to transmission and distribution lines, a southern California power company prepared the bulletin shown in the accompanying illustration and circulated it widely among its construction crews and district organizations. This drawing placed upon bulletin boards in prominent positions served to emphasize the importance of a few simple precautions which result in line construction against which no substantial complaint can be lodged.

Distribution Construction for Industrial Consumer



A typical example of distribution construction practice of The California Oregon Power Company is shown in the accompanying illustration of a pole-platform transformer installation. Primary service is for a 4-kv., four-wire circuit, and secondary service at 220 volts. The secondary circuit is metered on the pole, the meter box containing test block and demand meter. Outdoor potential and current transformers mounted in a box are placed at the top of the pole and a five-conductor multi-colored cable installed in iron conduit connects the meter to its transformers. The capacity of this particular installation is 112.5 kva. and it serves the Herrold Paving Company in Medford, Ore.

A Hose and Three Men Do the Work of Six Men

The intake for condenser cooling water of the Canyon City plant of the Southern Colorado Power Company is provided with heavy wire screens to prevent debis from entering the flume. These screens extend across a width of about 50 ft. and are paralleled by a board walk on which men provided with poles and hooks walk as they pull trash up from the screens and deposit it on the boards whence it is hauled off. In times of high water as many as six men are needed to keep thes creens free and the trash hauled away.

Then someone thought of attaching a heavy fire hose to a pump, and using the stream of water to wash the debris towards the two ends where one man at each end lifts the material out and into trucks. The hose method cleaned leaves and small trash away much better than it was possible to do with hand tools.

While used only at times of spring floods and high water, the idea proved quite valuable at a time when available men are badly needed elsewhere.

Fundamentals of Correct Metering—II

Continuing the Introductory Discussion and Illustrating the Application of Blondel's Theorem to the Metering of Three- and Four-Wire Circuits

By E. C. GOODALE, Tacoma, Washington.

IN THE opening article a brief outline of Blondel's theorem was given and an effort launched to show how this theorem operates in connection with metering problems. The discussion is continued from there.

In Fig. 2A is shown a voltage, E = 100 volts, which is assumed to be common to three meters each passing a different current. These currents might be I_a, I_b, and I_c, as indicated. The power component of I_a with respect to E is 6.93 amp., of I_b is 5 amp., and of I_c is -3.54 amp. (negative because it is more than 90 deg. out of phase with E). The sum of these power components is $6.93 + 5 - 3.54 = 8.39$ amp., hence the total power would be $100 \times 8.39 = 839$ watts.

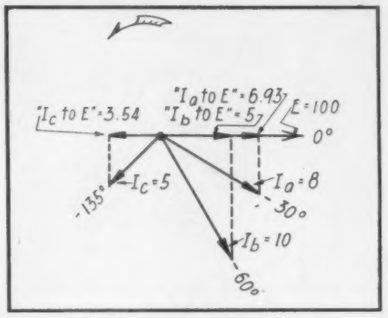


Fig. 2A. Vector diagram showing the "power components" or currents with respect to a common voltage.

The vector resultant of the three currents will be 18.2 amp. lagging E by 63 deg. as indicated in Fig. 2B. This will give a power component with respect to E of 8.39 amp. as indicated, and hence would register, again, as 839 watts.

If I_c were to be subtracted instead of added, Fig. 2C shows the resulting conditions. It (the I_c vector) would be reversed and added in the regular heel-and-toe manner as before, the resultant in this case being $I_{rr} = I_a + I_b - I_c = 18.0$ amp. lagging E by 30 deg. this time. It may be noted that the power component of I_c already was in a negative direction. Hence subtracting I_c, by reversing its direction, gives a positive power component again, this being but another example of the old rule that "two negatives make an affirmative." Hence the power component in this instance is greater than as shown in Fig. 2B, amounting to 15.47 amp. which also is the power component of the resultant of $I_a + I_b - I_c$. The power then would be 1,547 watts registered by either the sum of the registration of the three meters or by the registration of a fourth meter which is energized by the common voltage and passes a current equal to their vector resultant. This is true not only of three meters but of any number of meters passing currents of any values and in either direction, and all energized by a common voltage. The sum and differences of their registrations will be equal to the registration of a single meter energized by the common voltage and passing a current which is their vector resultant, taking their proper directions into account.

In Blondel's theorem we are concerned with two or more such currents at a time in proving out the correctness of metering whatever loads are connected to the system, as will be taken up in detail later in the series.

Figure 3 illustrates the application of Blondel's theorem to the metering of a three-wire system. It is the well known

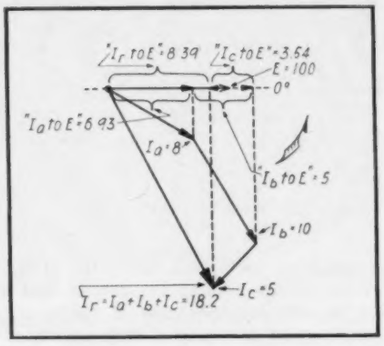


Fig. 2B. Vector polygon showing vectorial addition. Note that ("Ia to E") + ("Ib to E") + ("Ic to E") = "(Ia + Ib + Ic) to E."

two-wattmeter method of metering, the two meters usually being replaced by a single polyphase meter. This connection is good for any three-wire system, three phase, two phase, or even single phase. Although seldom used on single-phase three-wire systems, this scheme would, if used, give greater accuracy in any case in which the line-to-neutral voltages were unbalanced, as often is the case in rural electric range or domestic power circuits. An ordinary

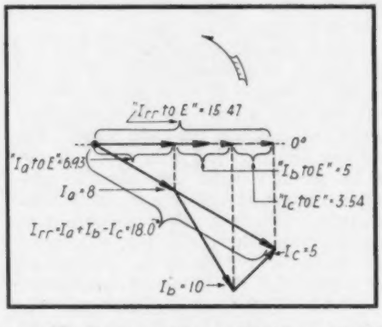


Fig. 2C. Vector polygon showing vectorial subtraction. Note that ("Ia to E") + ("Ib to E") — ("Ic to E") = "(Ia + Ib — Ic) to E."

110-volt, two-element, three-wire, polyphase meter connected on such a circuit would give accurate registration under any conditions of unbalance, whereas the ordinary single-element, two-current-coil, single-phase, three-wire meter would not register accurately under both unbalanced loads and unbalanced voltages.

For example, suppose the line-to-neutral voltages on a single-phase three-wire domestic circuit were 130 volts on one side and 100 volts on the other, and that the lower-voltage side were carrying the heavier load as usually is the case. Assume 30 amp. to be flowing to the 100-volt load and 3 amp. to the 130-volt load. Assume the loads to be pure resistance, as usually is true. The true power taken is $130 \times 3 = 390$ watts to the one side and $100 \times 30 = 3{,}000$ watts to the other, 3,390 watts total. The meter, however, registers the product of the total voltage, 230, multiplied by the average current, which is 33/2, or 16.5 amp. Hence the registration is $230 \times 16.5 = 3{,}795$ watts, which certainly is not in the customer's favor. Of course a badly unbalanced case was assumed but such cases often occur when there is but one customer on a transformer, and that one lives at a distance from the power line.

A polyphase meter connected with common potential from the neutral would register correctly such conditions of loading, regardless of unbalance of either voltages or loads, since each element passes the current to its own load and each is energized by the same voltage as is applied to its load. Of course the best thing to do is to remedy the unbalance in voltages, either by running a heavier neutral wire, by shortening the length of the run, or by balancing the loads. This latter is taken care of automatically with the newer type of range connections in which a 220-volt circuit is used for the plates instead of 110 volts as heretofore.

The correct method of metering a four-wire circuit, regardless of unbalance or number of phases, provided of course that it is an interconnected system, is shown in Fig. 4. A two-phase, four-wire non-interconnected system could **not** be metered by this connection since some of the metering connections would be found to be open. Besides, it could be more simply metered with two meters the same as for two separate single-phase systems. An interconnected system complicates the metering in this particular case.

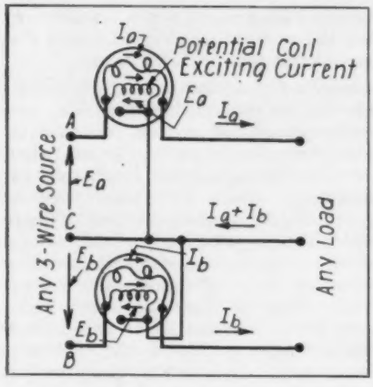


Fig. 3. Connection diagram indicating suitable metering for any three-wire system, whether single phase, two phase or three phase. This scheme is not usually applied to single-phase, three-wire systems, however.

Any wire may be taken for the common, but in the three-phase, four-wire circuit it is customary to choose the "neutral" wire as common, each of the remaining wires containing a current coil (or current transformer). Corresponding voltage coils (or their potential transformers) of course are tapped from the conductor in question to the common or "neutral" wire. The reason for choosing the neutral as common of course is obvious since it allows meters or instrument transformers of equal ratings to be used on all three legs of the circuit. To comply with Blondel's theorem on a four-wire system three meters or meter elements are necessary, and also three current transformers and three potential transformers if the rating of the circuit is high enough to necessitate their use.

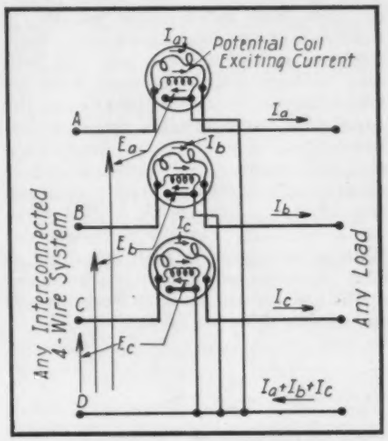


Fig. 4. Connections suitable for metering any interconnected four-wire system.

Short cut metering methods may be used and will give accurate results provided the line-to-neutral voltages are balanced or, if unbalanced, provided the vector sum of any two of them is equal, and opposite, to the third. For circuits of ratings high enough to necessitate the use of current transformers, three current transformers must be used if the loads are at all unbalanced. Only two potential transformers are needed if the vector sum of the two voltages is equal and opposite to the third, as noted above. One of each of these voltages works with its corresponding current, but the third current is passed through each element or meter in such a direction as to oppose each voltage, thus giving the effect of registering the product obtained when the current is multiplied by the negative sum of the two voltages with respect to this current, this being the equivalent of the product of the third current by the power component of its own voltage with respect to it, since its voltage is the negative resultant of the other two. Hence such a connection, subject to the limitations mentioned, will give the equivalent of Blondel's theorem as illustrated by Fig. 4.

EDITOR'S NOTE: This the second of a series of four articles by the author discussing the application of Blondel's theorem to various metering problems and giving an explanation of certain basic underlying principles. The next article will appear in an early issue of ELECTRICAL WEST.

Portable Tool House for Construction

DEVELOPED by the Portland Electric Power Company for use in connection with underground construction work, this wagon has proved itself a useful piece of equipment. It serves as an over-night or week-end storage place for all tools and small equipment used on the job and also carries locker space for the crew's clothing. It requires a minimum of street space and may be moved readily from job to job.

Pacific Coast Cities Adopt Arc Welding Code

According to Frank P. McKibben, nationally known authority on electric arc welding, one of the most interesting developments in building codes of recent years has been the publication of a uniform building code by the Pacific Coast Building Officials Conference, Section 2710 of which covers welding, and the adoption of this code by more than 40 cities and towns, thus legalizing the construction of welded buildings. According to Mr. McKibben, such legislation is needed throughout the entire country because the use of electric arc welding in the construction of large buildings has been demonstrated conclusively to be a success.

According to the report, nearly 150 major structures, including bridges, buildings, cars, cranes, ships, etc., have been fabricated to date using the electric arc welding process instead of riveting. This represents approximately a 50 per cent increase during the past year. The size of the structures so fabricated is also increasing and now includes many buildings throughout the United States varying in height from one to eleven stories.

Emergency Transformer Paralleling Expedited by Predetermination of Load Division

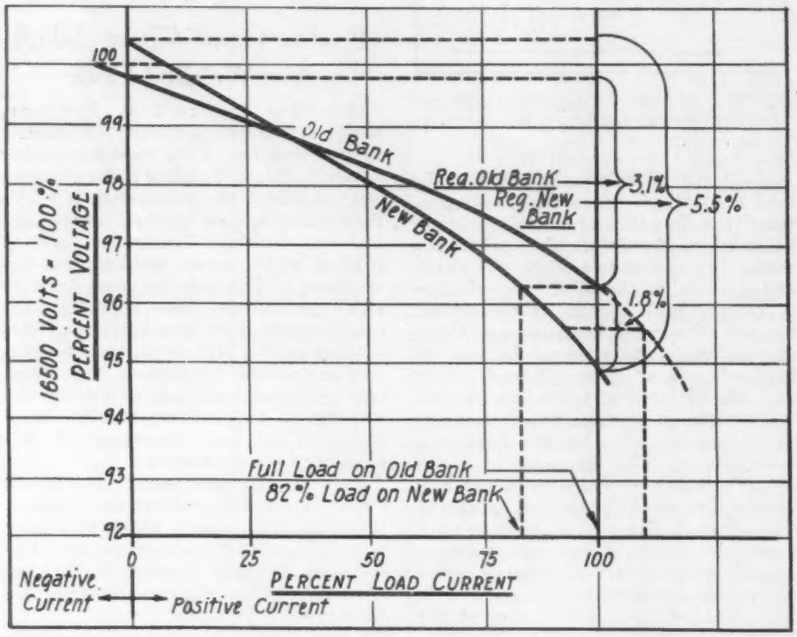
EMERGENCY conditions often require additional transformer bank capacity at a substation when it is impossible to obtain a transformer bank having the same operating characteristics as the bank already in service. Since the operating characteristics of a bank of transformers determine the degree to which it will divide load satisfactorily with another bank of transformers, it is important that they be given consideration. Under emergency conditions, therefore, it may become necessary to "shop around" among the available transformer banks on a given transmission or distribution system in order to find the bank which will work to the best advantage with the existing banks with which it is to be paralleled.

It is possible without complicated procedure to predict with acceptable accuracy just what will be the combined operating characteristics of any possible combination of transformer banks. The particular scheme outlined is intended only as a rough approximation, suitable for quick field application in case of emergency, but is sufficiently accurate for all practical purposes. This scheme lends itself not only as an aid in selecting transformer banks for paralleling but also in selecting the proper taps on each of the paralleled banks to produce the most desirable overall operating characteristics. It is based upon a graphic comparison of the regulation curves and the procedure can be explained best, perhaps, in the chronological sequence of the successive steps.

First. It is necessary to assume the expected normal operating power factor of the load in question.

Second. Provide a graphic voltage regulation chart such as that shown in the accompanying illustration and assume at the left-hand side of the chart the 100-per-cent voltage point for the graph.

This graphic voltage regulation chart can be made sufficiently accurate for practical purposes by knowing two points on the curve, the voltage at no load (taking into account the taps on which the transformer is to be used and the voltage of the source to which it is to be connected), and the voltage at full load under the same conditions (which can be obtained from the regulation figure given by the transformer specifications at the power factor for which the problem is being plotted). The name plates of most large transformers also give this latter figure for regulation at unity and at 80 per cent power factor, so that this information usually is available under field conditions. Having the no-load voltage and the full-load voltage under the conditions for which the problem is being plotted, the regulation curve can be drawn in between these two points, keeping in mind that the shape of the regulation curve should conform approximately to a section of a parabola or "K + I^2R" curve which will droop at the full-load end. With a little practice one can draw in such a curve carefully by free-hand method which will serve sufficiently well for solving this sort of problem.



A typical case of graphic predetermination of individual and combined operating characteristics of two transformer banks showing just what may be expected without extensive calculation. It may be noted that both regulation curves have been adjusted at the left-hand margin to correspond to the combined bank zero load voltage which is automatically determined by the equal division of no-load circulating current between the two banks.

Third. Plot the regulation curve of the existing bank of station transformers, indicated in the accompanying illustration as "old bank."

Fourth. Tabulate for both the "old bank" and the "new bank" all of the possible voltage ratios between primary and secondary for each bank. To do this, divide the voltage for each high-voltage tap by the voltage for each low-voltage tap for each bank and for all possible combinations, thus establishing for each bank a list of ratios such as 5.61, 5.82, 5.95, etc.

Fifth. Compare the ratio lists and select the ratios, one from each bank, which most closely agree at no load, and which will result in the nearest approach to the operating voltage desired. Thus the high-tension tap and the low-tension tap that will bring about a satisfactory zero load voltage for the combined banks are determined.

It may be well to note here that this satisfactory zero load point of the second bank may not necessarily coincide directly with the zero load point of the first bank, particularly if the regulation curves of the two banks are radically different. The bank having the greatest variation in regulation should be on such a tap that the no-load voltage (100 per cent voltage) point of this bank is higher than that of the other bank, thus permitting the regulation curves of the two banks to be made to cross at as nearly 100-per-cent load for each bank as possible. It may be seen that the regulation curve of the bank determines the slope of the curve in each case whereas the location of the regulation curve, up or down on the graph sheet, is determined by the tap selected. In other words, there is a family of regulation curves for each bank, one for each of the ratios computed under step No. 4.

The selection of the correct curve then is the next step. It may be well to note here also that if the two regulation curves do not cross each other somewhere on the graph it obviously is impractical to put the two banks of transformers together on the taps represented by the non-crossing curves. When the curves do not intersect there is no point of load at which the transformer banks would share load equally, and the circulating current might even exceed full load in some cases.

Sixth. Determine the zero load voltage for the combined banks. This zero load voltage, of course, will be the point represented on the graph where the circulating currents of the two banks are equal. This point then determines and becomes the new 100-per-cent voltage point or no-load voltage point of the combined banks and it is necessary to re-designate the voltage index along the left-hand and right-hand margins of the graph sheet. It is not possible to choose the corrected voltage scale at an earlier time for it is not known where the horizontal line representing the no-load voltage will fall until the regulation curves are plotted showing their relationship to each other on the temporary scale. The

location of this no-voltage line will be at the point where the current produced by the one transformer bank is equal to that received by the other transformer bank. Hence the actual no-load voltage of the combined banks will be this new 110-per-cent voltage line from which the new ordinate values may be chosen.

Seventh. Determine the final operating characteristics of the two banks together at any desired load point indicated on the graph as described in the following. As shown in the accompanying illustration, for instance, at the 100-per-cent or full-load point on the "old bank" of transformers a horizontal projection from the point of intersection of the regulation curve of the "old bank" and the vertical ordinate representing 100-per-cent load will intersect the regulation curve of the "new bank" at a point indicating approximately 82-per-cent load on the "new bank." Under this condition, then, and without overloading either of the banks the combined capacity of the two 6,000-kva. banks for which the accompanying graph was prepared would be 10,900 kva. Under a load condition whereby the total load on the two banks combined would be 12,000 kva. the new bank would be loaded to 100 per cent while the old bank would be overloaded approximately 10 per cent as indicated on the graph.

It may be well to note that the operating results may either overexcite or underexcite either of the transformer banks, as the case may be, but that such a condition may be neglected entirely if less than 15 per cent in order to utilize the best distribution of total load between the two banks according to their current-carrying capacities. Several successive applications of this short-cut method of predicting the parallel operating characteristics of two different banks of transformers have shown that the predicted results check almost exactly in each case with the measured results obtained after the banks have been placed in service on taps selected as described.

Storm Causes Freak Trouble

Electric service to a community over a single-conductor line with a 22-mile earth return for the other side of the circuit was one of the freak results of a "silver thaw" experienced in southwestern Washington during January. A report from Pacific Beach, Wash., to the headquarters office of the Grays Harbor Railway & Light Company at Aberdeen, Wash., revealed the fact that lights but no three-phase power were available to the community on the morning in question. Investigation showed that a tree had fallen across the three-phase power line supplying Pacific Beach, short circuiting and blowing the fuses on two of the three legs of the circuit, leaving only one conductor intact.

This, together with the fact that electrict lights actually were burning at Pacific Beach, puzzled the maintenance crew until it was discovered that 22 miles away on the Montesano line a conductor was down and trailing on the ground. Thus single-phase power was being transmitted to Pacific Beach over the single good conductor on the Pacific Beach line, returning via the Montesano line and the 22-mile earth path to complete the circuit.

What Happens in a Modern Steam Plant Furnace?

Because of the widespread interest in the subject of combustion of natural gas fuel, L. J. Kraps, efficiency engineer for the Southern California Edison Company's Long Beach steam plants, prepared for publication in "Edison Energy" a brief description of what goes on inside furnaces of the boilers feeding the 100,000-kva. steam-electric generating unit at Long Beach 3. An abstract is given in the following:

Gas used at the plant comes from local fields and is composed of 80 per cent methane (CH_4) and 20 per cent ethane (C_2H_6), by volume. Thus each cubic foot of gas contains 0.036 lb. of methane and 0.01694 lb. of ethane, which gives it a weight of 0.05294 lb. per cu.ft. For a steam flow of 350,000 lb. per hour at 450 lb. gage pressure, and 710 deg. F with boilers operating at an efficiency of 84 per cent, about 370,000 cu.ft. of gas is burned per hour per boiler. This amounts to burning 19,500 lb. (by weight) of gas per hour per boiler.

To burn 0.036 lb. of methane under the best conditions possible requires 0.622 lb. of air and to burn 0.01694 lb. of ethane requires 0.273 lb. of air. Thus each cubic foot of gas burned requires 0.895 lb. of air and the 370,000 cu.ft. of gas burned per hour per boiler requires 331,150 lb. of air per hour. Under operating conditions 15 per cent more air is supplied to the furnaces than is required theoretically. Thus under average conditions the amount of air and gas handled per boiler per hour totals 412,412 lb., more than 206 tons.

Products of combustion per boiler per hour under the enumerated conditions are 55,036 lb. of carbon dioxide (CO_2), 254,634 lb. of nitrogen (N_2), and 41,070 lb. of water (H_2O) in vapor.

Electric-Drive Equipment for Line Crews

A great labor saver for line construction and salvage work is shown in the accompanying illustration. An old truck chassis has been made into a trailer upon which is mounted electric motor-driven winch equipment. The trailer as shown was built by the Portland Electric Power Company of Portland, Ore., for use in pulling in new conductors or new cables and also has been used to advantage in salvaging wire and cable on line take-down jobs. The equipment consists, in this particular case, of ordinary clutch-controlled winch equipment driven by a 500-volt, d-c. motor which operates from the trolley system of the company's street railway.

NEW BOOKS for the Engineer

PROCEEDINGS OF THE INTERNATIONAL CONGRESS ON ILLUMINATION, 1928. Cloth bound; 1,443 pages; illustrated; 6 x 9 in. Published 1929 under the direction of the executive committee of the International Congress on Illumination. Price $10. Application for copies should be made to the Illuminating Engineering Society, 29 West 39th St., New York.—This volume includes the proceedings of the seventh plenary session of the International Commission on Illumination held at Saranac Inn, New York, in September, 1928, and also selected papers presented at the 23rd annual convention of the Illuminating Engineering Society. The subjects treated at length include street lighting, glare research, motor vehicle headlighting, precision photometry and standards, natural and decorative lighting, school and factory lighting, motion picture lighting and aviation lighting. In all more than sixty reports by recognized authorities throughout the world are included. The volume is indexed and cross-indexed and well illustrated, including color plates of the 1915 Panama Pacific Exposition lighting.

Ideas for the Contractor

Lighting Installations

Stretch the *Sporting* Day

Tennis Is Joined by Golf and Even Football as a Night Sport Under Recently Installed Systems of Field Illumination

SUNDOWN no longer spells the end of play. For the person busy during the day the hours of recreation and outdoor sport are no longer closed. Night lighting of fields and courts, long an experimental dream, is coming into actual use rapidly. Even those full field sports, golf, football and baseball, are being lighted for night play.

Electrical West two years ago published in this department (see Electrical West, June, July and August, 1927, pp. 473, 32, 94) a series of articles on the installation methods for such outdoor lighting. In the following accounts, however, it is not the theoretical method which will be described but the actual installation. Since the installations referred to are separate and distinct projects each will be treated individually in a short description below.

That these examples set forth possibilities for still further development of this type of business is obvious. Here is a field worth cultivation. These installations merely show that it can be done, that the demand exists and that methods have been worked out successfully to meet the peculiar requirements of even the most difficult of outdoor game problems of illumination.

A spot of brilliant white light in the midst of darkness marks Denver's illuminated tennis courts at night in City Park. Designed for summer use only, the courts proved so attractive that throughout the winter months they were kept open to the public and were constantly in use except during storms.

Above each of the two concrete paved courts are suspended five 1,000-watt lighting units at a height of 32 ft. These units are suspended on ⅜-in. messenger wires, using Thompson disconnects for raising and lowering when relamping is necessary.

An outstanding feature of the Denver installation is absence of glare from the strong illumination directly overhead. Many experts who have performed on the Denver courts at night declare they prefer artificial to sun light, and that they are able to play a faster game by reason of improved vision and lack of enervating heat.

Four wood poles, one at each end of each court, 45 ft. high, are used to support the messenger wires carrying the illuminating units. Down guys and anchors hold these poles rigidly in place at each corner of the court.

Denver's lighted courts are used even in winter night play.

Illuminating intensity of the ten lamps is approximately 18 foot-candles. Light distribution is practically even oven the entire playing area.

The Denver installation was designed by F. S. Peterson, illuminating engineer for the Public Service Company of Colorado. The central location of the lighting units above the players instead of at borders of the courts diffuses illumination almost 100 per cent and eliminates bothersome shadows.

Complete cost of the lighting job was $375. Due to the popularity of the night tennis courts, serious consideration is given the proposal that similar installations be made in three other municipally-owned parks.

During the twelve-month period since the courts have been in operation, more than 3,000 players have been served. One hour is allowed each pair or set of players. Courts are closed at 10:30 p.m.

Texas Football Field Lighted

Designed by L. J. Last, illuminating engineer for the El Paso Electric Company, a field floodlighting system was installed early this year which allows night football play at the El Paso High School staduim. The plans for the permanent installation called for 48 units of 1,000 watts each mounted on eight fabricated steel towers. These were so arranged that at each corner of the field the towers would contain a battery of four floodlights, 50 ft. above the ground. Four more towers, two on each side of the field, carry a battery of eight floodlights each. The beams are so distributed as to cover the field and eliminate cross shadows. A 6-ft. candle intensity was provided.

Use of the field for night games, graduation exercises, pageants and various civic celebrations was made possible by this installation. Prior to this permanent installation a temporary one on wooden poles had been in use, as illustrated on page 131. This installation consisted of a large number of small units strung on a messenger

Cleveland opened up a night practice course for golf which points the way to similar installations in other cities. Units are mounted on the roof of a long row of covered tees.

wire suspended between poles set at each corner of the field.

Pasadena Rose Bowl Lighting

The Rose Bowl in the City of Pasadena is also to have a floodlighting system installed, according to Benjamin F. DeLanty, general manager of the Municipal Light and Power Department.

Following the approval of the contract between the city and the Tournament of Roses Association on the lighting of this stadium, the light department signed a contract for the reflectors.

The lights, 40 in number, will cost $4,800. The reflectors, 34-in. diameter floodlights, of cast aluminum, and weighing 80 lb., will be equipped with a 1,500-watt lamp. The reflectors will be arranged on the east and west sides of the bowl, with three poles to a side.

The poles bearing the lights will be 4 ft. in diameter and 55 ft. in length and will be set in a concrete foundation on the top of the bowl at the rear of the top row of seats of the stadium. The lights will be 110 ft. above the playing field. The poles will be hollow with ladders inside of each of them reaching to the platform at the top where the lights will be located. The poles are being designed to withstand heavy wind stresses.

Beams from the reflectors will make the playing field at the bowl as light as day and the rays will be so fucused that there will be no glare in the eyes of players or spectators. The lights will be permanently placed on the poles and tested out to get the proper focus in a series of practice football games which will be played late this summer, so that when the regular playing season starts in the fall it will not be necessary to carry on experiments to get the proper focus of lights.

Corcoran Lights Baseball Field

Fred C. Carroll, manager of the Corcoran district of the San Joaquin Light & Power Corporation, and Jack Hammond, lighting specialist for the company, were responsible for the installation of a very efficient and inexpensive lighting system at the city's baseball park at Corcoran, Calif.

The equipment consists of twelve eliptical angle porcelain reflectors equipped with 1,000-watt lamps, mounted on 30-ft. poles and spaced 25 ft. apart in a horseshoe form at the back of the diamond. The reflectors protect the eyes of the players from glare and the spacing is such that shadows are eliminated. Control is provided by means of an enclosed switch on the pole directly back of home plate.

Golf Becomes a Night Sport

An electrically-lighted golf course—a practice course rather than one of regulation size—is now in nightly operation at Cleveland, Ohio. The innovation of golf after dark has been introduced as part of another innovation, that of a course where novices at the game may perfect their technique under exceptionally favorable conditions. To this end a practice course that gives the player a liberal opportunity for practice, either day or night, without the least interference from other players, has been laid out.

There is a long row of about 40 fairly commodious booths, open only on the side toward the course. Each is well lighted. The player pays a fee for a specified period of play, and steps into one of the booths where he is completely protected from disagreeable weather.

He can hit golf balls continuously, the supply of balls being unlimited. At the end of every 50 minutes a signal bell announces an interval of ten minutes during which an army of caddies goes out upon the course and retrieves the balls.

The course is laid out for shots of different distances, running from 50 yards up to 275 yards. There are also novelty targets which add zest to the playing. Finally there are two eighteen-hole putting greens and a miniature nine-hole course complete, where entire games can be played. The longest drive on this course is 60 yards. A refreshment stand and parking space complete the equipment of this unusual golfing institution.

The illumination, which will appeal to thousands of persons who cannot get out on a golf course in the day-time except on weekends and holidays, has been planned and carried out by lighting engineers of the National Lamp Works.

Six large-diameter reflectors with concentrated filament lamps mounted in projectors giving a narrow beam totaling 500,000 candlepower, illuminate the golf balls during shots to far distances. Twenty-two others, also 1,000-watt, equipped with projectors giving a broad beam and with a lightly stippled glass cover, illuminate the balls during shots at nearer distances. The total illumination is equivalent to about 250,000 lumens.

When these lights were first put in use this spring professional golfers who were present and tried a number of drives declared they could follow the ball even more readily than in the day-time because it was a white spot well defined by the light as it sailed away against a dark background.

El Paso lined each side of its football field with units for night play.

Simplified Line-Drop Formula

By Otto Wiemer, Department of Electricity, Los Angeles.

WHEN applied to line voltage of 110, 220 or 440 volts, the general formula for per cent line-drop can be reduced to a much simpler form by using a resistance constant of 11 ohms per mil-foot of wire, or 22 ohms per mil-foot of circuit. This constant is justified by its use in the line-drop formula in the "Standard Handbook for Electrical Engineers." The general formula for per cent drop is expressed as follows:

$$\text{Per cent drop} = \frac{22 \times \text{amp.-ft.} \times 100\%}{\text{circ.mil} \times \text{line voltage}}$$

When standard line voltages are substituted in this formula, cancellation reduces the constants to numbers that simplify calculations.

$$\text{For 220-volt circ.mils} = \frac{\text{amp.-ft.} \times 10}{\%\ \text{drop}}$$

$$\text{Per cent drop} = \frac{\text{amp.-ft.} \times 10}{\text{circ.mils}}$$

For 110 volts multiply results by 2.
For 440 volts divide results by 2.

It is usually more expedient to use the 220-volt formula as if all circuits were 220 volts and then multiply or divide results as shown. However, if it is less confusing, separate formulas can be written for 110 and 440 volts by multiplying or dividing the 220-volt constants by two, as the case may require.

Given: A 110/220-volt feeder, distance 175 ft. from main switch to distribution panel, and a balanced load of 180 amp. on each outside leg of the feeder. To find (1) nearest size wire for 1.5 per cent drop and (2) actual drop for conductor chosen.

$$\text{circ.mils} = \frac{180 \times 175 \times 10}{1.5} = 210{,}000$$

Nearest size wire = 4/0 = 211,000 circ.mils.
Substituting in second equation:

$$\text{Per cent drop} = \frac{180 \times 175 \times 10}{211{,}000} = 1.49\%.$$

If you forget the formula, just remember that circ.mils divided by 10 will give ampere-feet for 1 per cent drop at 220 volts. Then figure the drop for other voltages by proportion. Please do not use the shortest method of all, which is to get the inspector to figure line-drop for you.

More and Better Camels!

As Earl Browne, manager of the San Francisco Contractors Association put it, "This is the most concise statement of the situation in our field that I've ever seen." This bit from a recent San Francisco *Chronicle* editorial sums up competitive warfare:

The methods of cutthroat competition are outworn. Knockdown and dragout fighting for existing business does not get more business. Better far, and it is the modern idea, is fighting for more business for everyone.

The Arabs spend their time stealing each other's camels. In the long run they are just where they started, less the camels killed and wasted in the fighting. They never have any more camels.

Utah League Starts Red Seal Plan—A program to adopt the Red Seal Plan has been approved by the board of trustees of the Electrical League of Utah. Negotiations now are under way with The Society for Electrical Development, Inc., to obtain the necessary license.

Willows Baptist Church Complete Electrically

COMPLETELY electrified in all particulars is the new Baptist Church at Willows, Calif. It demonstrates to what extent electricity can be used in a building of this type. The connected load is 125 kw. Most of this load is in electric air heating and in cooking and water heating equipment.

An unusual feature of the installation is a separate 3-kw. heater in the basement back of the baptismal font to heat the water for the font.

The heating of the main chapel by electricity provides a major item. In all there are 55 air heaters installed in the building, ranging from 1½ kw. to 6 kw. In the main chapel itself there are nine 5-kw. wall insert heaters installed. Besides these there is a 6-kw. heater at the rear and a 5-kw. in the Sunday school room. The heaters will be seen as the dark areas at each side of the chapel.

Besides electric heat there is a 9-kw. electric range and another 5-kw. water heater is installed in the social hall kitchen. A dish-washing sink is also installed. In this kitchen also, above a steam table, are placed a row of convenience outlets for percolators and other small appliances. A 5-kw. immersion-type water heater is used for the steam table.

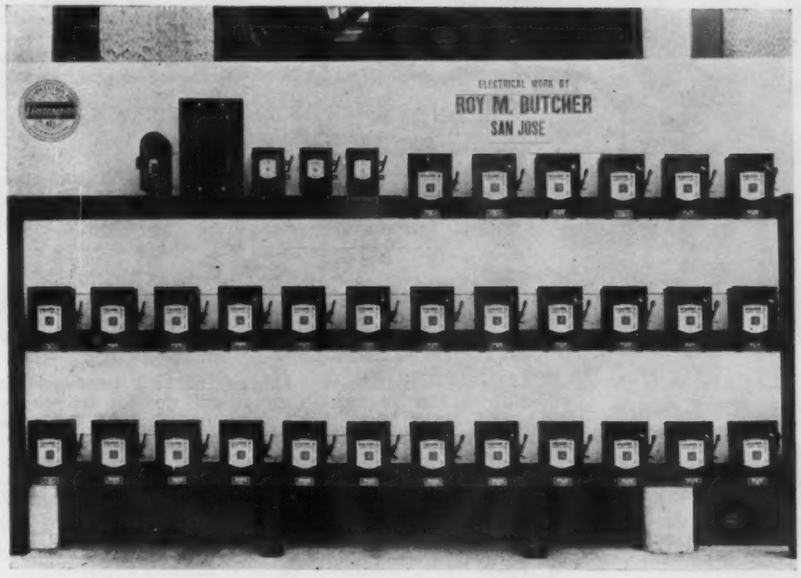
Lighting and other features of the building have also been given careful consideration. The main wiring of the building was installed by the Glenn County Electric Works which also made up the switchboard and gutters in its own shop at Willows. The electric heaters were sold by the McDonald Electric Company at Willows.

Economical Meter Board From Stock Material

NEAT, workmanlike and economical is the installation recently made by Roy M. Butcher, Electragist of San Jose, Calif., for an apartment house in that city.

The particular feature of this assembled switchboard is the use of meter test type switches built by the manufacturer for ganging. They are a standard product and can be assembled in any fashion required by the contractor. A single screw connects the adjoining switches. The only alternate for a job of this kind is the standard safety switch with a special separate gutter. Where the gutter is an integral part of the switch a much neater installation can be made.

This installation was made approximately 30 per cent cheaper than an individual switch job and makes a better looking installation. The added feature of the meter test links so that the power company can make tests without any long interruption of service to the individual tenants, was a selling point. In apartment houses and industrials where a number of individual switches are required, it makes a compact, good looking sort of job.



Floodlighting Is "By-Product" of Ice Cream Plant

FLOODLIGHTING is used effectively by the Alfred Ice Cream Company, of Los Angeles, at its Tipton powdered milk plant. Here floodlighting may well be called a by-product of the plant for the company recently installed a large turbine and generator to make use of the steam derived in the condensing process in milk reduction. Formerly this steam was blown out into the air at a high temperature. It was decided to utilize it to generate the electricity needed for the operation of the plant motor equipment and control. A sufficient surplus was available for a complete floodlighting installation. In this way the plant is advertised at night to the passing motorists on the main highway adjacent to the building.

The Tulare Electric Company, at Tulare, made the installation of the 600-kva. generator and the electrical equipment necessary for it. The generator is on a double-throw switch so that it may be cut out and stand-by service from the power company used in case of shut down. The floodlighting equipment consists of eight 500-watt units, six of which are placed on the ground, two at each end of the building and two in front. The remaining two are on the roof level to kill the shadow which would appear on the second tier of the building if only ground units were used. The accompanying illustration shows the method of mounting the floodlights on a concrete base and the protection of them by means of a guard rail at the edge of the lawn.

Electric control is used extensively throughout the plant. On the ice hoist push button control is provided for the ice chamber elevator, which automatically raises the ice, dumps and resets it automatically for the next load. The plant is also equipped with an electrically operated barrel loader which loads the barrels directly on cars. A cream can loader is also electrically driven and controlled. Magnetic switches each with push button start and stop operate much of the ice machinery. Limit switches to stop the equipment at the proper point in operations are also used in a number of instances.

The ranch adjacent to the cream and powdered milk plant is also electrified in every detail. All of the bungalows on the ranch have electric range and water heater installed and use a number of electrical appliances.

Organize Electric Club at Huntington Park

Electrical contractors of Huntington Park, Vernon, Bell, Maywood and South Gate, have organized themselves as "The Southeast Electric Club."

The purpose of the organization is to develop better harmony and co-operation among the contractors themselves, and between the central station and individual contractors.

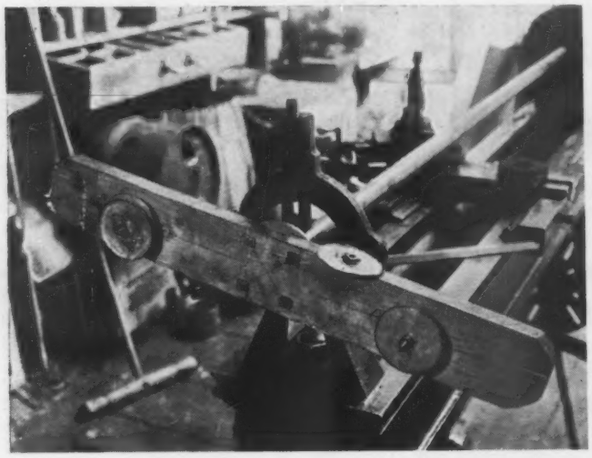
The officers elected are as follows: president—Louis J. Meller, electrical contractor, Huntington Park; vice-president—A. R. Mills, inspector for the City of Bell; secretary-treasurer—A. L. Pryor, inspector for the City of Huntington Park.

The meetings are preceded by a dinner, which is accompanied by entertainment and music. The meetings usually take up matters of local interest to the contractor, such as ordinances, inspections, trade conditions, etc.

MOTOR

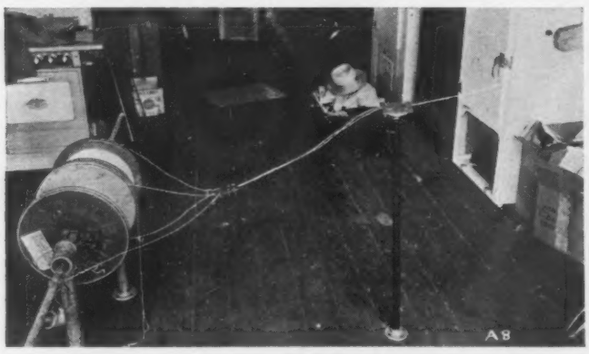
A Department for and by Motor Specialists

When Improvised Methods Were Needed



WHEN the Southern Oregon Electric Company of Medford, Ore., decided to establish a motor repair department it was in the middle of the season and temporary steps had to be taken immediately to handle the various problems.

An ingenious temporary winding lathe has been fashioned. As shown in the photograph a piece of board is fastened to a length of ¾-in. pipe by means of an ordinary floor plate. Bolts and large sheet metal washers are made up for the guides on which the coils can be wound. With one end of



the pipe in the lathe chuck this temporary form revolves at the other end and the required number of turns is made.

A brake is likewise improvised from pipe fittings and pieces of fiber clamped together and mounted on the floor as shown in the second photograph. This brake accommodates two wires and keeps them uniformly spaced and unkinked as they come from the spool before being wound into a coil.

Likewise a temporary rack for the spools has been made of conduit. An ordinary weight on the end of a rope is used over the rim of the spool to keep tension on the wire.

After being wound the coils are held together by pieces of ordinary gummed paper tape. The washers removed, the coils are taken to a shaper made of two blocks of wood nailed to a workbench where with a wooden shaper and one side held in the slot between these two pieces of wood the coils are shaped to the required form for inserting in the motor slots.

The coils are then inserted in the motor slots and taped completely. The one and seven hookup in wiring is preferred by this firm. Raymond Bigger, superintendent, claims that this hookup eliminates mistakes and checks itself as it goes along.

After winding, taping and hookup of the motor is accomplished the entire stator is preheated and placed in a shallow pan and completely covered with varnish. It is then baked in the oven, which itself has been constructed ingeniously in the shop.

This oven is made of heavy sheet metal lined with asbestos board with a gravel floor to take up drippings. In it are placed, as shown in the photograph, six 500-watt space heating units. An ordinary range oven thermometer is used to determine the temperature. The oven is heated to about 212 deg. F.

Previous to the coating with varnish the wound stator or rotor is placed in the oven for a preheating so that the varnish will be absorbed completely in all the crevices of the tape fabric. Three coats of varnish are given and a total of nine hours' baking puts the motor in first-class shape for duty in pumping plant work. The job is finished off with a coating of gray paint.

While many of the methods used were born of emergency they have proved to be effective and economical and are still in use. Improvements are being planned as the rush season passes.

USEFUL POWER

HORSEPOWER is a measure of the time rate of doing work and is defined as the equivalent of raising 33,000 lb. 1 ft. in 1 min. One horsepower is equivalent to 746 watts.

TORQUE is the pull or turning moment required in applying power by rotation and varies inversely as the radius at which the power is applied. The torque T is expressed in pounds at 1 ft. radius, sometimes called pound-feet.

FULL LOAD TORQUE is the turning moment required to develop full rated output of a motor of given horsepower at a given speed.

The torque T of any motor at any output expressed in pounds at 1 ft. radius can be found by means of the following formula:

$$T = \frac{5.250 \times \text{hp.}}{\text{r.p.m.}}$$

Conversely, if the torque in pounds at 1 ft. radius is known, the horsepower at any given speed can be determined from the formula:

$$\text{Hp.} = \frac{T \times \text{r.p.m.}}{5{,}250}$$

STARTING TORQUE is the turning moment a motor will develop in starting when impressed with a given starting voltage. Starting torque is usually expressed in terms of full load torque, as two times full load torque, etc.

PULLOUT TORQUE, or maximum running torque, is the maximum turning moment a motor will develop under running conditions. The pullout torque of a wound rotor induction motor may be 80 per cent of the maximum starting torque, while the pullout torque of a squirrel cage induction motor will exceed the maximum starting torque, in some cases by as much as 100 per cent. Pullout torque is usually expressed in terms of full load torque.

EFFICIENCY is the ratio of the useful "output" of a machine to its total "input."

APPARENT POWER in an alternating current circuit is the product of the readings of the voltmeter and ammeter and is ordinarily expressed as kva. This value may be greater than the reading at the same time on the wattmeter.

DEFINITIONS

TRUE POWER in an alternating current circuit is the average value of the products of the coincident instantaneous values of the current and voltages for a complete cycle as indicated by the readings on a wattmeter and is ordinarily expressed in kw.

POWER FACTOR is the ratio of the true power (kw. or wattmeter reading) to the apparent power (kva. or product of voltmeter and ammeter readings). The ratio is usually expressed in per cent and cannot be greater than 100 per cent.

If true power is expressed in kilowatts (kw.) and apparent power as the product of kilovolts (1,000 volts) and amperes or kva.,

$$\text{Power factor (P.F.)} = \frac{\text{kw.}}{\text{kva.}}$$

For estimating purposes, power factors can be assumed as follows except on long transmission lines: incandescent lighting load, no motors, 95 per cent; lighting and motors, 85 per cent; motors only, 80 per cent.

MEASUREMENT OF POWER. If W = watts, E = average volts between line terminals, I = average line current, and P.F. = power factor expressed as a decimal fraction, the following formulas represent their relations:

Single-phase $W = EI \times P.F.$

Two-phase $W = 2EI \times P.F.$

Three-phase $W = 1.732\ EI \times P.F.$

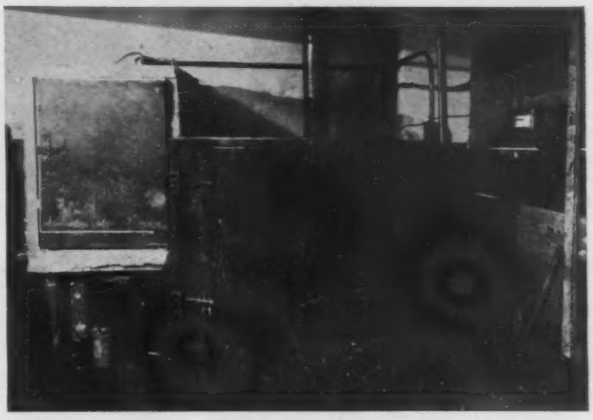
CURRENT—From the above formulas the current can be found as follows:

$$\text{Single-phase}\quad I = \frac{W}{E \times P.F.}$$

$$\text{Two-phase}\quad I = \frac{W}{2E \times P.F.} = \frac{0.5W}{E \times P.F.}$$

$$\text{Three-phase}\quad I = \frac{W}{1.732\,E \times P.F.} = \frac{0.578\,W}{E \times P.F.}$$

Adds Second Oven for Small Motors

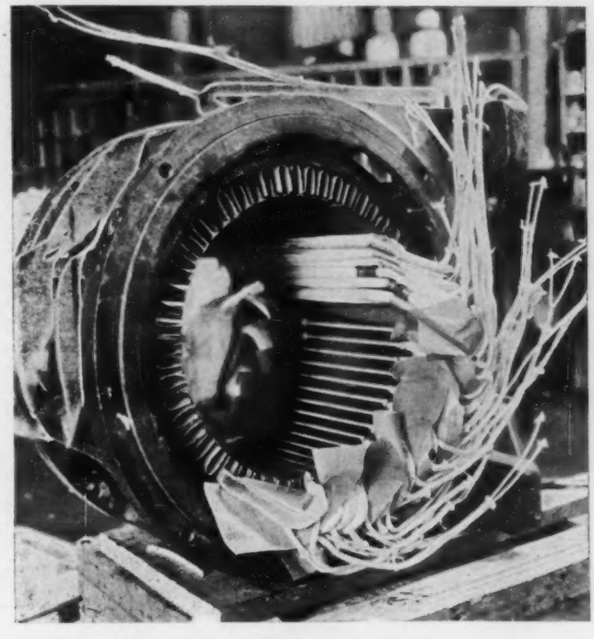


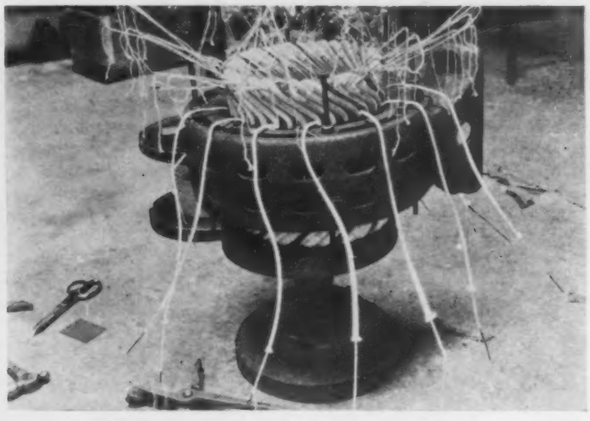
AFTER using a 7-kw. oven for four years it was decided by the Quality Electric Motor Company, of Oakland, to install immediately adjacent to it a 2-kw. oven for the drying out and the baking of small motor windings and coils.

The 7-kw. oven employed in the past will still be used for motors of 10 hp. up to 100 hp. It is heated by means of two 3¾-kw. strip heaters and is maintained at a temperature of 250 deg. F. Coils are baked in it for a period of eight hours.

The small oven will use four ½-kw. strip heaters. Both ovens are connected to a recording pyrometer. The ovens were made in the shops of the company itself. The large oven is asbestos lined with a metal frame. The small oven is brick lined.

A Good Turn Each Day





AN EXTREMELY handy piece of apparatus in the rewinding of motors is a small turntable. This one, fashioned of old machine parts, is used constantly by the California Electric Works in San Diego. After the coils have been inserted in the slots of the motor stator the stator is laid on this turntable back down. It is easy to scrape the magnet wire terminals of each coil in preparation for soldering of joints, etc. The fact that it can be turned at will helps materially in the process.

Three Types of Industrial Lighting Explained

That the Estimator May Plan and Sell Better Factory Illumination Based on Engineering Knowledge

By J. R. WILSON, Quality Electric Works, Los Angeles.

THE previous installment of this series of articles gave the recommended foot-candle intensities for many lines of industry. As stated, these intensities are recommended because experience has proved that they give a high rate of production with a minimum rate of spoilage. The values given in the table are based upon the amount of illumination at the "working plane," or point at which the operation or series of operations is performed.

Usually this working plane is assumed to be 30 in. above the floor level, or what is known as "bench height." However, some operations may be performed at a higher level or may even be done at floor level. To attain the desired production or results the designated amount of illumination must be delivered to the working plane, wherever that may be.

In the majority of cases some form of reflector must be used to direct the light where it will give maximum results.

In the field of industrial illumination many forms of metal reflectors, glass reflectors and combinations of both are used. The question of what kind of reflector to use for a given job is determined usually by the amount of money available for the job.

The latest trend is toward either the semi-enclosed or the totally enclosed types. These types, if rightly placed and of proper size, give the highest degree of illumination per unit of current consumption. Also as is to be expected, they are considerably higher in price than the various types of metal reflectors.

In a previous article several types of metal reflectors were illustrated. A little thought will show that there must be logical engineering reasons for placing these numerous designs on the market.

Conditions of building design and uses of illumination are usually the determining factors in reflector selection. In one case medium intensity over a wide area may be desired; in another case elimination of glare may be essential; in still another case the light may need to be "poured on" to a restricted area. In each of these cases a different type of reflector is indicated. However, in later years the number of types has been reduced to a minimum.

Manufacturers of metal reflectors intended for industrial application through mutual agreement have chosen about eight separate types of unit designed to meet almost any requirement. A knowledge of the conditions to which each of these types is applicable is essential to successful industrial illumination.

Analysis shows that there are really only three divisions of industrial lighting. Briefly these are: (1) general overhead lighting, (2) group lighting, and (3) local lighting. These may be further divided into (a) inside lighting and (b) outside lighting, meaning inside a building or outside a building.

General Overhead Lighting

As the name implies, general overhead lighting is employed to furnish light to a room without regard to lighting the work at a given location in the room. This form of lighting should be so planned that adequate light will be available at ALL points in the room.

The layout for this system of lighting consists of placing individual lighting units in the center of imaginary squares or rectangles. If the work to be done can be classified as rough, then the squares can be of comparatively large area. Where fine work is to be performed the squares should be small.

Group Lighting

Group lighting consists of a system of units so placed as to light a particular group of machines or a desired floor area of restricted size. The difference between this system and that given above is that in the first case the total area of the room receives a "blanket" of light, while in the second case certain parts of the room or machinery therein, have the light concentrated upon them.

Local Lighting

In this system each machine, bench, or other location, is treated as an individual problem without regard to the others, and enough light is supplied, by means of local reflectors and lamps, to meet the needs of the work being done in that machine.

In some kinds of work local lighting of very high intensity is required. Local lighting is usually employed to supplement a system of general overhead lighting. In this way the overhead system may be of low intensity and of comparatively low cost.

However, the general tendency today is toward general overhead lighting, with a small number of units of very high intensity. In this way daylight conditions can be very nearly duplicated for the purposes of night-time production.

For each of the foregoing groups one or more types of reflectors are available. A general statement of this rule would be:

For general overhead or group lighting use:

R.L.M. standard dome reflectors.
Glass steel diffusers.
Standard bowl-type reflectors.
Glass-top reflectors.
Vapor-proof reflectors.

For local lighting use:

Small angle-type reflectors.
Small bowl-type reflectors.
Special service reflectors.

The above, of course, is merely a general statement of permissible use and does not mean that the rule will meet the needs of each individual case. To see just what each reflector will do, it will be necessary to consider the design and manufacturer's recommendation of some of the standard types, which will be done in the next article of this series.

Question Box

Q. What is Litzendraht cable?—G.L.P.

A. This cable is composed of strands of fine enameled wire the whole being enclosed in an outer cover of cotton or silk braid. It is much used for high frequency currents to minimize the effects of "skin effect" and eddy current loss.

Q. What is an instant heavisidon?—A.T.M.

A. A kinematic computing device for solving transmission line problems, such as determination of current, voltage and power factor at ends of long lines.

Q. What is a Rosenberg generator?—F.E.

A. A variable speed direct current generator used for axle driven car lighting systems. The direction of the voltage is independent of the direction of rotation.

Q. What is an acyclic generator? B.N.S.

A. This is a direct current generator in which a conductor cuts a magnetic field always in one direction. The e.m.f. generated in a conductor always has the same direction with respect to that conductor. No commutator is required.

Pine Crest — *Red Seal Brings City Comfort to a Magnificent Mountain Home Near* Grass Valley

WINTER'S snows almost cover it over and yet despite its gloomiest days there is electrical sunshine in the unique and palatial country home of Mr. and Mrs. H. W. Robinson, "Pine Crest," five miles out of Grass Valley, Calif., in the Sierra. This because Mrs. Robinson had built into the wall above the arched doorways of the living room a grilled window of amber glass (shown below) through which electric light spreads over the room as if it were sunlight, imparting cheer to the room.

In the great fireplace built of stone from the mines of the region, is concealed a window floodlight to bring out the beauty of the stone and to light the bronze statue of a miner set in a niche (center picture).

Electrically the home is extraordinary besides being Red Seal. Living room lighting is on magnetic switches. Telephones and interphones connect each room. The kitchen has a 9-kw. range and there are three electric refrigerators, in various places. Automatic electric control is on the hot water system. Lighting fixtures everywhere are unique, many designed and made by Mrs. Robinson: jazz lighting for the billiard and social room, barn lighting for the tavern next to it. Fred Foote, Grass Valley contractor, made the installation.

Better Merchandising

The West Carries On—

The Food Preservation Program Originated in Portland
Now Made a National September Activity

OUT of the West came the first practical program for selling refrigeration through all channels co-operatively: ice manufacturers, milk dealers, food dealers, refrigerator dealers and utilities all working in unison to sell refrigeration. Back to the West has come the enlarged reflection of that idea in the form of the National Food Preservation Program, being operated during the month of September this year. And now universally the West again swings into this movement to make it completely successful in the land of its inception.

In Portland, the city from which the idea was adopted, the program will continue as it has for the past three years, only perhaps with greater impetus because of the importance of the movement nationally. Both the Portland Electric Power Company and the Northwestern Electric Company are organized to carry on the usual yearly activity with the added features of the national campaign incorporated. The essay contest with its $25,000 in prizes, the display and advertising material, the milk bottle caps and wrappers, the broadcast talks, will all be added to the previous activities.

The disitinctive symbol which will mark all advertising and decorate milk bottle caps.

Likewise in Washington organizations have been formed to sponsor the program. A. C. McMicken, Portland Electric Power Company, is regional director for both states.

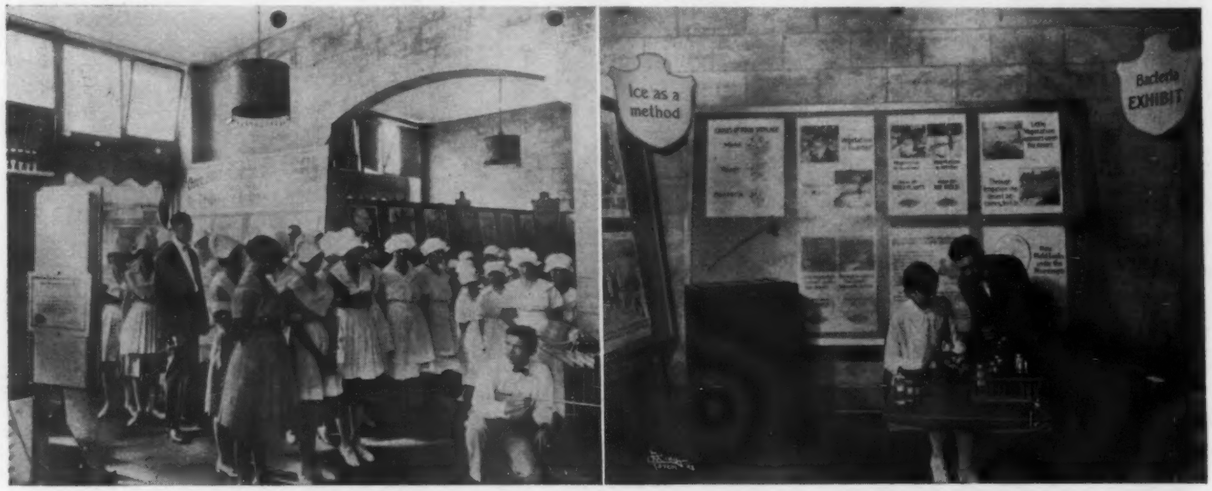
In Utah and Idaho the work is heading up under P. M. Parry, of the Utah Power & Light Company. In Colorado and Wyoming George Buck of the Public Service Company of Colorado is planning extensive promotional activity during this period.

In California the work is particularly well under way. For the territory north of the Tehachapi Mountains and including Nevada R. T. Stephens, Pacific Gas and Electric Company, is at the head of committees of electric and ice refrigerator people, milk dealers, utilities and others interested. For southern California and Arizona R. G. Kenyon, Southern California Edison Company, has organized a strong promotional activity for September.

What to Do to Capitalize

So that the entire electrical industry may align itself to benefit from this nation-wide activity and cash in on its advertising value an outline of the local activity which will be undertaken by the committees in charge in practically every district is given here. The place of the individual or company in this scheme will be obvious and the benefits to be derived from a sweeping unified program brought to a focus locally in each community.

All local merchants handling any type of refrigeration equipment are being asked to dress a window and display this equipment for at least one week in September. The larger department and furniture stores are already



Food preservation clinics, such as that conducted recently by the P. F. Pickette Company, Frigidaire distributor in Spokane, will attract wide attention. The management of the Davenport Hotel sent over its famous restaurant staff to hear a lecture on proper food refrigeration given by Mr. Stork.

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Delivery trucks of an ice company not only displaying banners advertising refrigeration but also advertising electric refrigerators.

PORTLAND ICE AND COLD STORAGE

Portland Sells Refrigeration

Ice manufacturers, power companies, the gas company, mechanical refrigeration agents and dealers, furniture and department stores in Portland have combined in a co-operative effort to sell refrigeration. A survey shows how successful these efforts have been.

AFTER nearly a year of existence, the Portland Refrigeration Trades Association can look back on a series of constructive promotional activities and can commence to count commensurate results. Formed in October, 1926, by seven dealers and distributors of electrically-driven mechanical plants, the association has been expanded to include also distributors of gas refrigerators and ice box manufacturers. Its membership now includes 32 firms.

Before the formation of the association, dealers in refrigeration had no common meeting place, the individuals would come to know each other better, differences of opinion could be ironed out, advertising ideas and sales methods could be discussed and, in a measure, standardized, and co-operative promotional activities could be worked out. These, then, were the ideas back of the formation of the association, which has now functioned for about a year.

"Protect Your Food and Health with Refrigeration," and in order to make the effort community-wide it was necessary to secure the co-operation of all interests dealing in refrigeration of any sort. Thus this campaign was made the vehicle for interesting other allied trades, as the ice delivery companies and ice box manufacturers and dealers, in the association, and it was at this time that the membership was expanded to include all such dealers. Little difficulty was experienced in enlisting in the movement a large majority of the dealers affected. A summary of the firms entering the campaign is as follows:

Furniture Stores	5	Power Companies	2
Department Stores	2	Ice Manufacturers and Distributors	11
Mechanical Refrigeration Agents	5	Gas Companies	1
Dealers	9	Ice Box Manufacturers	1

REFRIGERATION EDUCATIONAL CAMPAIGN

The campaign was set to run for ten days in May. All the co-operative advertising was general in char-

MILK IS FOOD — SAFETY BOILS LOW

PROTECT YOUR FOOD and HEALTH with Proper REFRIGERATION

Note: Portland dairies attached this card to every bottle of milk delivered in the city during a refrigeration campaign.

An additional medium for spreading the message was found in enlisting the support of the dairies. Although these firms had no refrigeration to sell, they readily recognized the value to the service they rendered of adequate refrigeration in the home, and nine companies

An idea given birth in Portland, Ore., and reported in ELECTRICAL WEST, October, 1927, has spread over the entire country in the present National Food Preservation Program.

organized to do this. All electrical dealers and power company offices, too, are expected to feature electric refrigeration in window displays during this month.

The milk dealers practically universally have promised to use the special milk bottle caps provided during the month. These caps have on them the symbol of the program, the thermometer with the "50°" emphasis. The collars for milk bottles will be used in a number of instances. It is estimated that 6,000,000 milk bottle caps will be used in northern California alone.

A special booklet giving reasons for keeping foods protected from variations in temperature and stressing the 50-deg. idea, has been issued. It also contains details concerning the prize essay contest. For northern California alone 82,000 of these have been ordered. The plan is to give these to all who ask for them as a result of the advertising.

Aside from individual dealer advertising a general local advertising campaign is to be conducted in each district. In California this will consist of newspaper and magazine advertising. The California Electrical Bureau has arranged to feature this program in its state-wide magazine advertising during September. The Pacific Gas and Electric Company will divert its advertising to the subject during the month and feature the subject in "P. G. and E. Progress" which reaches 500,000 customers. Besides this the program itself will run a series of from three to five large dominating advertisements in all big city dailies and a series of smaller advertisements in all country papers.

Billboards will be used in southern California by all companies in metropolitan areas. The Pacific Gas and Electric Company and Coast Counties Gas & Electric Company in northern California will likewise use billboards, they have announced.

Truck banners and automobile tire covers have been ordered for all the company cars of these companies and for ice companies, furniture and department store cars and dealers' cars.

Displays of particular note are planned in a number of instances. The Pacific Gas and Electric Company has decided to devote its entire space, comprising three large booths, at the State Fair at Sacramento to refrigeration. All exhibits at county fairs during the month of September, too, will feature refrigeration. The representatives of refrigerator manufacturers are likewise preparing for special displays.

A special envelope stuffer is being prepared by the southern California committee to be sent to all electric customers of all companies in that territory.

Further details of any particular section activity can be obtained from the regional directors mentioned herein. Local conditions to some extent govern the procedure to be followed although in general that given here will obtain in most of the West.

"Limited Quantity Only" Brings Quick Sale

There is something to the psychology of a limited number of appliances on sale at a time which stimulates sales activity.

A large department store in Los Angeles recently advertised a furniture sale during which only twelve tables were to be sold. At another sale just 32 electric washers were to be disposed of, which seemed to make the prospective customers hurry to get there in order to obtain the bargain. The scheme makes them feel that the price advertised provides an especial "buy." The plan also has a tendency to speed up shopping in the early hours of the day.

Chain stores selling groceries have found effective the limiting of a number of pounds of butter to one customer.

Displays at fairs and shows, such as this of the Central Arizona Light & Power Company at a Phoenix newspaper's industrial show, will center attention on refrigeration.

One of the special sale window displays in Denver.

Are Birthday Sales

Colorado Utilities Find That

MORE than $15,000 worth of electrical appliances were sold in one day by the Public Service Company of Colorado in Denver during its Birthday Sale, held Nov. 13, last year. That seems to be an adequate answer to the question, "Does the public believe in birthday sales?" It was the biggest one day's business ever accomplished by the company. Taking all of the properties together, which include fourteen small communities in northern Colorado and Cheyenne, Wyo., the total sales for the day were $50,950.

Likewise each year in September, the Southern Colorado Power Company. Pueblo, Colo., celebrates the anniversary of entry into its present building on Main St. with a special merchandising event—an anniversary sale. It starts off the fall sales season with a rush.

Because merchants have established the privilege of offering mark-downs at an anniversary sale, the company is able to use bargain appeal, and special offers, both in respect to terms and prices. The sale helps to move slow items. Large-unit advertising opens it, and units of smaller size give it support. The idea has proved an outstanding success.

With the Public Service Company of Colorado the anniversary has an added significance. The fact that an official and the company whose destinies he controls were born on the same day of the same year might appear to the public as an interesting conincidence—if it became known at all. But to a live new business manager, such coincidence amounts to nothing less than opportunity.

G. B. Buck, new business manager for the Public Service Company of Colorado, discovered that Clare N. Stannard, vice-president and general manager, was ushered into this world on the identical date when the old Denver Gas Company, the foundation of the present Colorado unit of Cities Service, was incorporated. Forthwith there were hectic signs of activity in Mr. Buck's and other departments, preparing for an epochal sale to commemorate the event.

Advertisements, truck banners, window cards and other publicity devices heralded the news to the public—announcing that customers would be granted a 10 per cent discount on all purchases, cash or credit, made on Mr. Stannard's birthday, which was also the Public Service company's birthday. The night before the sale, every article on the sales floor received a red tag: "Anniversary Sale. Ten per cent discount today only." When patrons flocked in on the morrow they bought generously from the company's fourteen stores throughout Colorado and $25,000 receipts were the total for the day.

That was in 1927. Having "started something," Mr. Buck said: "We'll double the quota next year. This will be an annual event."

On Nov. 13, 1928, the Public Service Company's sales amounted to $50,950. This year last year's triumphant record is scheduled to be eclipsed by at least a mark of $100,000.

As to methods of procedure: Announcement was made beforehand that all customers who telephoned for taxi service would be brought to the company's display room. Display of a receipt, signifying purchase of any article of merchandise from an incandescent lamp to an expensive radio set, entitled the bearer to transportation home again. Ten Denver automobiles were kept in constant service. A porter in livery acted as doorman. An augmented sales force was recruited from among "outside" men. Nobody was urged to buy anything, but the little red tags were constant reminders that "today only" would the 10 per cent discount prevail.

A feature of the sale was the small amount of newspaper space used in giving it publicity. A small "teaser" advertisement was run about a week before the full page advertisement. In the teaser was merely the announcement of the date of the sale, the amount of discount to be granted and the slogan for the day, "You Can Celebrate With Us by Saving." The full page advertisement in the Denver papers enumerated and illustrated many of the items offered.

The display windows, particularly those in the Denver establishment, bore the brunt of the advertising effort. It was actually spectacular in Denver, because of the large number of windows available. In addition to well arranged merchandise, each window carried a mounted or framed photograph of Mr. Stannard. This made the birthday idea more tangible and reasonable than if it had been hooked up with such an abstract entity as a public utility corporation.

Some of the 1928 figures are available. Twenty-five gas furnaces were sold—at an average price of $175. Approximately the same number of electric refrigerators were disposed of. Fifteen radio sets, fifteen washing machines and a half-dozen electric ironers

Crowds filled the display floor to take advantage of the one-day feature prices.

a Success?

They Are Exceptionally So

changed hands. Curling irons galore, lamps, lamp shades and all manner of merchandise went the same route—all load builders for the company.

The question was asked: "How can the company, operating on a close merchandising margin, afford to lop off 10 per cent?" The answer, supplied by Mr. Buck: "Most of the larger items, like washing machines and radios, were purchased by customers six or eight months ahead of their schedules. Throughout that half-year or more of time, the company sold them current or gas that otherwise would not have been sold."

He added: "As a quick load builder, nothing in our sales program equals the anniversary sale. A good many people thought, at first, that the sale would be continued over three or four days. But when they found that the sale ended when doors closed for the day, they realized their opportunity was gone for another year. In 1928 there was little holding back or resistance to the lure of a discount on the theory that it would be available tomorrow. We anticipate that 1929 will find veterans of earlier anniversary sales on the ground, bringing with them friends who have learned of the event by word-of-mouth."

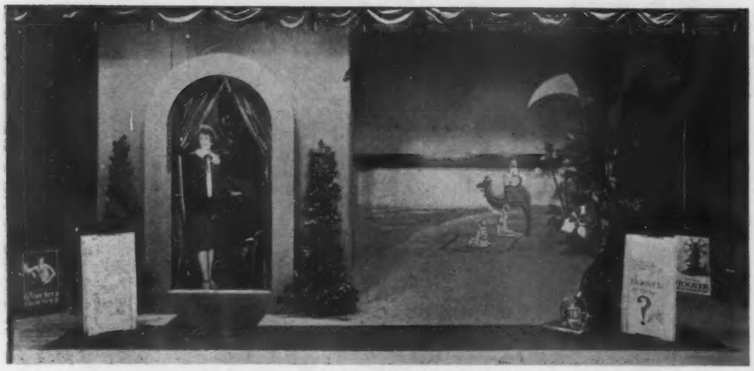
It has been only within the last few years that the birthday idea has been used. But in that short time the public has become educated to know absolutely that a one-day sale of this sort means ONE DAY. As Edward Rowland, electrical merchandising manager, adds:

Big department store style advertisement drawing attention to the birthday specials of the Southern Colorado Power Company.

"Then another thing, the public sees us figure the new price to them. All of our merchandise is marked with green tags—the regular selling price. These tags remain during the sale, for the red tags contain only the information that 10 per cent discount is allowed. This makes it necessary for the customer and the salesman to figure out the sale price when the transaction is being concluded. The public knows we are honest in our offers."

Linking the birthday of its manager and of the company as the double reason for a special sales event, the Public Service Company of Colorado, through its windows offered exceptional bargains to its customers.

Consistent Winner in Window Display Contests



IN THE national window display contest held during December last year by the manufacturers of the Hoover cleaner, J. U. Berry of the Valley Electrical Supply Company, of Fresno, won first place in cities of from 25,000 to 100,000 population. The prize of $100 was received by him in February.

The Three Wise Men and the spirit of Christmas were used as the motif. A large painting showed the wise men on a desert beholding the star of Bethlehem just above a deep purple horizon. A card in the window connected the story. It read: "Will you be one of the wise men who gives his wife the Hoover this Christmas?"

A peep into a room on the left shows a Hoover cut-out using a hose extension attachment on an upholstered chair. A card nearby calls attention to the desert sand extending from the painting to the foreground with this suggestion: "Just outside your door are a million grains of sand that spell destruction to your rugs. Protect your rug investment by giving her the Hoover this Christmas."

J. U. BERRY

This was the fourth national window contest entered by Berry during 1928 in which he carried off a prize—two first and two fourth prizes.

Westinghouse Institute Sets Ideal Example

LIGHTING as it should be, in actual size windows, shops, schoolrooms, and dwarfed streets, is exhibited in a permanent institute recently opened and occupying an entire floor of the Grand Central Palace, New York City, sponsored by the Westinghouse Lamp Company. Three of many views are shown here: the first of Mazda Ave., with its actual windows of various kinds of merchandise correctly lighted; next the street lighting exhibit, and below the reception room with modernistic panel lighting in the walls. A model electric store and central station show room are there. A theater with a ten-scene, preset, motor-operated switchboard provides the ultimate in stage lighting. History is omitted—it is all today at its best and tomorrow's possibilities.

JUNE BRIDE
FIRST
CENTRAL ELECTRIC CO.
WATSONVILLE
SECOND
H.L.MILLER CO.
PASADENA
THIRD
KIMBALL-UPSON CO.
SACRAMENTO
FOURTH
SIERRA MADRE
ELECTRIC CO.
FIFTH
NEWBERY ELECTRIC CORP.
LOS ANGELES
SIXTH
ELECTRIC LIGHTING SUPPLY CO
LOS ANGELES
PRIZE WINNERS

News of the Industry

Government's Action on Matters Pertinent to the Electrical Industry in the West

Washington Correspondence

FOR the purpose of ascertaining more perfectly the distribution of electrical goods, the electrical division of the U. S. Department of Commerce is completing plans for a national census to be taken among the various retail units handling electric refrigerators and heating appliances. This study will comprise two distinct surveys—one covering refrigerators and the other devoted exclusively to heating appliances. It is expected that a further survey will be made to check the distribution of motor-driven apparatus.

As the result of these studies, it will be possible to establish the percentage of the entire business in each type of article done by the various retail units. A survey that is being completed of the distribution of radio goods, for instance, has shown, according to tentative findings, that there are nearly 100 different types of establishments handling these articles, ranging from beauty parlors to garages. It is expected that the same situation will be revealed with regard to the electric appliances—a large number of outlets but a few of them controlling the greater part of the business.

Particular attention will be directed toward finding out the percentage of the appliance business that is done by the central stations. It is believed that the findings will disclose that the central stations do not dominate the market for electrical apparatus taken as a whole, although it may be shown that there are certain types of appliances that they are obliged to concentrate on because no other establishment desires to do so. When the true picture of the part that central stations play in appliance distribution is presented, it is thought that the agitation that has been directed against their sales activities will be largely dissipated.

Protests have been made to the Federal Trade Commission from certain refrigerator interests, it is stated, asking the commission to examine closely into the appliance sale business of the power companies. After looking into this protest, government officials do not believe that there is any ground for action. The issue has come up locally in the City of Washington as to whether or not the utility companies are charging their customers in their bills for any losses that they may incur in the sale of appliances. It is believed, however, that the utilities commission will take no action toward a general investigation of the books of the gas and electric companies unless actual proof is presented that losses in appliance sales are being passed off to the public.

All G. E. Wholesale Houses Merged

Effective Oct. 1, 1929, the fourteen wholesale distributing corporations owned by the General Electric Company will be consolidated into the General Electric Supply Corporation (of Delaware). These companies have for many years distributed General Electric products and the plan involves no change of ownership. The cosolidated corporation will be in a much better position to offer nation-wide service through its ability to give service from any one of 76 houses, through interchangeability of stocks, and speedier and more economical operation.

The tentative organization plans indicate corporate officers and directors as follows:

Gerard Swope, chairman of board; C. E. Patterson, president and director; J. L. Buchanan, executive vice-president and director; J. G. Johannesen, vice-president, Eastern region, and director; D. E. Harris, vice-president, Western region, and director; L. R. Link, secretary-treasurer; L. M. Nichols, comptroller; N. R. Birge, A. D. Cameron. H. C. Houck, J. E. Kewley, G. C. Osborn. T. K. Quinn, E. O. Shreve, and C. E. Wilson, directors.

The department heads, district managers and other officers will be announced when appointed on Oct. 1, 1929.

River Surveys Progressing

Reports on the flood control, power development and irrigation surveys being conducted by army engineers on 200 of the nation's streams will be available to Congress when it convenes in December. This study, which was authorized by Congress two years ago, has been progressing steadily since that time and it is believed that the work will be entirely finished in three years. As the surveys on the important rivers will require the longest time, the reports that will be submitted to Congress this fall will be on the lesser streams for the most part.

Prior studies have been carried so far on some of the large rivers, however, that it is expected the reports on these will be available within several months also.

The Columbia River and its tributaries are regarded as the largest single item of the work from the dual standpoint of reclamation and power development. It has been estimated that the potential power development of which this river is capable is 50 per cent greater than the entire amount of power now developed from the country's streams. Funds totaling $300,000 have been placed in the hands of the district engineers now surveying the Columbia, and a much larger amount will be necessary to complete the work.

Flathead Lake Report Favorable

A favorable report on the Flathead Lake project of the Montana Power Company has been received from the district engineer. This report covers the one side which constitutes the initial and principal development of power on the Flathead River between its mouth and Flathead Lake. The receipt of a report favorable to the applicant for the license indicates that it has been possible to harmonize the conflicting interests. It is understood that under the plan it will be possible to regulate the lake level through a range of 10 ft. to an upper elevation of 2,893 ft.

To connect Boulder Dam with the outside world and haul the men and materials essential to its construction, the Los Angeles & Salt Lake Railroad has been authorized by the Interstate Commerce Commission to build a 22.6-mile extension from a connection with its main line about 7 miles south of Las Vegas, Nevada. Construction will commence this fall with the expectation that the line will be completed next spring, or sooner if necessary to meet the convenience of the government. From the terminus of the line, construction to the Colorado River will be carried forward by the federal government. No railroad serves the site of the dam.

Construction cost of the proposed line is estimated at $840,606 to be financed by the Union Pacific Railroad or the Oregon Short Line, or both. These companies own all the capital stock of the Los Angeles & Salt Lake road. As no contracts have been let by the government for construction of the dam as yet, the road was not able to furnish to the Interstate Commerce Commission a detailed estimate of prospective traffic but it is estimated that the gross tonnage of material and supplies required will amount to 8,015,000 tons, of which 6,000,000 tons will be sand and rock.

Stanford to Give Degree of E.E. in Illumination

Stanford University is now ready to grant the degree of Electrical Engineering in Illumination. In other words the electrical engineering student interested in that phase of engineering may specialize in illumination work during his fifth and sixth years and receive a degree from the university attesting his proficiency in that art.

This action on the part of the university had its inception about two years ago when L. G. Gianini, illuminating engineer of the Edison Lamp Works of the General Electric Company, San Francisco, proposed to the electrical engineering department the idea of several lectures on illumination. The idea was so well thought of that instead of two lectures a three months' course was given in the subject. This was popular enough so that he was asked to give a continuation of the course for the next three months.

Dr. Harris J. Ryan, executive head of the electrical engineering department at Stanford University, who has always been a staunch believer in the value of illumination courses to electrical and mechanical engineering students, then prevailed on Mr. Gianini to accept a lectureship at the university in order to make the illumination work a permanent part of the curriculum. During the past year the lighting work has consisted of a preliminary three months' course of two one-hour lectures a week. The continuation of this was a combination lecture and laboratory course for three months, with a one-hour lecture and a three-hour laboratory period per week.

Following the formation of the School of Engineering at Stanford University, which increases the requirements for an electrical engineering degree so that six years are required to meet them, Dr. Harris J. Ryan, who was convinced of the importance and scope of the illumination work, made it, along with power generation, power transmission, and communication, a division or specialty in which the sixth year electrical graduate student might secure his engineering degree.

In addition to the requirements for all engineering degrees, the illuminating engineer must cover general phases of psychology, physiology, architecture and business economics besides those of his illumination work.

Applicants for Boulder Dam Power Submit Proposals

Representatives of private interests and municipalities desiring to purchase power from the Boulder Dam project met at Denver, Colo., Aug. 12, with Dr. Elwood Mead, head of the reclamation service, and Raymond F. Walter, chief engineer, to submit proposals.

Applicants came principally from four states, California, Arizona, Nevada and Utah. The Southern California Edison Company, represented by George C. Ward, is the largest private corporation asking for contracts under the Boulder Dam project.

Mr. Mead's purpose in coming to Denver at this time, he asserted, was to examine and analyze propositions submitted for power purchase and does not concern distribution of water, states' rights, state compacts or other problems involved under the Swing-Johnson Bill.

Preliminary Work Started on Ariel Power Project

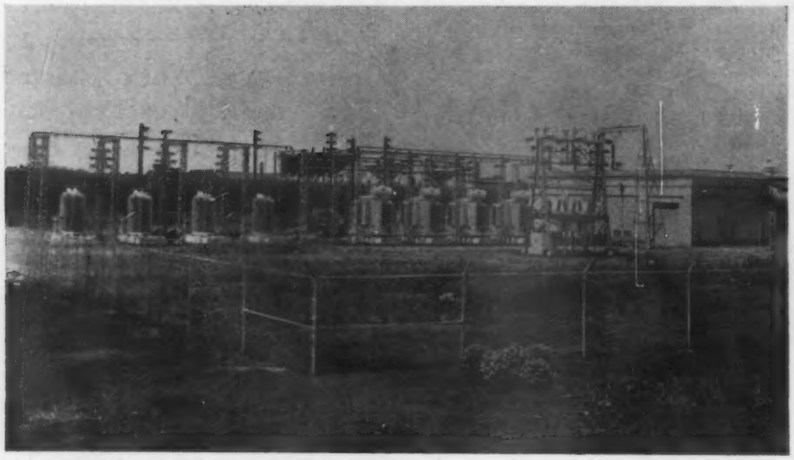
The granting by the Federal Power Commission of a preliminary permit to the Inland Power & Light Company, Portland, to develop 160,000 kw. on the Lewis River in southwestern Washington, opens the way for some preliminary work on the part of the company toward the development of its project at the Ariel site twelve miles above Woodland. Actual construction at the site will not commence until the issuance of the license, it is announced, but work on the transmission line from Vancouver to the site is to be started at once so that power for construction will be available when needed. Foundation tests for the dam have been completed.

Development of the project is planned in four units of 40,000 kw. each. A single dam, about 190 ft. high above normal water level, will create a lake about twelve miles long, impounding approximately 220,000 acre-ft. of usable storage. A single power house, designed to be expanded as units are added, will be built immediately below the dam. The dam and first unit are estimated to cost $8,250,000, with the total ultimate cost of the four units without transmission lines estimated at $11,500,000.

Granite Wall Dynamited to Provide Rock for Salt Springs Dam

TO LOOSEN rock for use in the dam now being erected across the Mokelumne River on the Pacific Gas and Electric Company's Salt Springs project, 84,500 lb. of dynamite were used to move a wall of solid granite, 750 ft. long, 45 ft. thick, and 150 ft. deep. The explosion was made electrically, and the total amount of rock moved was 330,000 tons. Thirty-five holes, 140 ft. deep, were drilled, and each contained 1¼ tons of dynamite.

New Substation Operating on Coast Counties' System



WHEN the switch was thrown on Aug. 5 in the new Watsonville substation of the Coast Counties Gas & Electric Company, Santa Cruz, Calif., the voltage of the system in that vicinity was stepped up from 22 kv. to 60 kv. At a special luncheon arranged in honor of the occasion by R. J. Barnett, in charge of public relations, A. E. Strong, general superintendent, taking the place of J. B. Wilson, president of the Coast Counties company, who was unavoidably absent, gave an interesting talk on the substation's mechanism.

Details of City of Seattle's $10,000,000 Development Plan Announced

OUTLINE of the plan for a five-year $10,000,000 development program for the municipal light department of Seattle, Wash., has been made public by Philip Tindall, councilman and chairman of the public utilities committee. The program calls for replacement of all overhead wiring with underground conduit systems throughout the entire business district, the extension of productional facilities in practically all substations within the city limits, and the reimbursement of the light department to the extent of some $2,000,000 loaned out of its earnings for betterments and extensions already completed.

The program also includes the expenditure of at least $1,000,000 a year for five years to extend the department's power and light service in various districts for the accommodation of increasing numbers of customers. The first step in the five-year program is an ordinance to provide $500,000 for immediate work. Further appropriations will probably be asked in ordinances to be introduced as soon as the council decides on a policy to be followed in connection with the construction of a new downtown City Light substation at Third Ave. and Madison St.

Two proposals are now before the council in respect to this structure. Under the first, it is proposed that the City Light Department erect its own building on the site, which is already owned by the city, at an estimated expense of $500,000, while under the other is being considered an offer by private interests to erect a tower-type substation and office structure in which the city is to rent substation and office space, with the understanding that the building will become city property at the end of 35 years.

Betterments and extensions contemplated in the ordinances introduced in the council include improvements at six substations and extensions of present underground wiring between the Denny Hill regrade and Jackson St., along First, Second, Third and Fourth Aves. It is estimated that the cost of this work, which is to begin immediately, will be nearly $500,000. Of this amount $172,220 is already on hand in funds previously authorized by the council for such purposes. An additional $316,000 in new money would be voted as a loan to the capital investment account of the department from the light fund surplus under Tindall's plan.

An additional feature of the general plan is the underground wiring of the Denny Hill regrade district before new paving is put in. Superintendent J. D. Ross and other officials of the light department have been working on the details of the general plan for some time.

Commission to Investigate California Water Supply

The determination of policies for the long view development of California's water resources has been the subject of recent collaboration between President Hoover and the Governor of California, with the result that a commission is to be appointed by the President to make a study of the development of the water resources of that state. The following statement was made by Mr. Hoover relative to the appointment of the commission:

"Some years ago I advocated the coordination of the multitude of activities, governmental and otherwise, engaged in direct and indirect control and development of California water supply and the provision of some definite policies instead of the haphazard and often conflicting action of different agencies. Governor Young has forwarded this idea by enactment of certain state legislation which now enables us to bring about a larger measure of such coordination. The first step is the creation of a commission to supervise an exhaustive investigation of the engineering facts and to determine the policies which should be pursued in the long view development of the state, as to irrigation, flood control, navigation and power.

"In order that the commission should embrace all agencies I have requested the War Department, which controls navigation channels and flood control, the Power Commission, which controls water power permits, and the Interior Department, which is interested in irrigation, each to designate a member of the commission which the governor is now appointing. The governor's representatives will embrace the state agencies and leading citizens.

"The State of California has passed a liberal appropriation representing the interest of the state and the federal agencies will support the investigation with the staff and its accumulated information."

Grounds of Spokane Falls to Be Memorial Park

Landscaping of the grounds surround the Spokane Falls in the heart of Spokane, Wash., as a memorial park to the late William Augustus White, of New York, for many years chairman of the board of The Washington Water Power Company, will be undertaken soon, according to the announcement of his son, Harold T. White, of New York.

Permission has been secured from the electric service company, and work is to be started at once. The project calls for the making of necessary fills, planting of lawns, shrubs and trees to restore the setting of the falls to its natural condition as it was some 40 years ago. Promenade walks, guarded by chains, will be established so that sightseers may view the falls, and the Monroe St. power station of The Washington Water Power Company below.

Scope of Light's Golden Jubilee Celebration to Be World-Wide

IN ADDITION to the plans for the celebration of the Golden Jubilee of Light that are going forward in practically every community in the United States, Light's Golden Jubilee committee has announced that a number of foreign countries have signified their intention of joining in the world-wide tribute to Thomas Alva Edison on the 50th anniversary of the invention of his incondescent lamp. The information received so far is entirely preliminary, of course, and definite plans are yet to be prepared by each foreign participant.

Austria is planning a Light Festival during the Autumn Exhibition Sept. 2-8 and the Annual Congress of the German Association of Technical Illumination Sept. 12-14, both of which will be held in Vienna. Addresses will be delivered by leading Austrian scientists who have been closely associated with the development of the incandescent lamp, and the public will be given an opportunity to observe the actual machines formerly used in lamp production.

In Japan special committees have been appointed in Tokyo and Osaka to prepare plans, and the illumination development committee of the Illuminating Engineering Society also has appointed committees for the same purpose. The subjects for the celebration as it now stands include an exhibition of illumination, demonstration of 50-kw. lamps, electric home exhibitions, celebration meeting on Oct. 21, lecture for the public, essay contest, light festival, electric sign and window contest, game of rugby played at night, dances and a banquet at the Imperial Hotel Auditorium, a cable to Edison, lectures at the Imperial University and radio talks.

In Argentina the Sociedad Argentina de Lumincultura, an organization recently formed for the promotion of lighting, is planning a Light Festival in Buenos Aires. Plans are incomplete, but a two weeks' window lighting campaign is under consideration, and it is hoped to secure the co-operation of the government and municipalities for general illumination of buildings and probably a waterfront lighting display.

France has expressed a willingness to join in the celebration, and Italy, Germany, Holland, Sweden, China, Mexico, and Braizil are working on celebration plans.

Committees are already at work on plans for celebrating the Jubilee in communities throughout the Pacific Coast section of the United States. In California E. P. Markee, district manager, Edison Lamp Works of the General Electric Company, Los Angeles, and Morris Hixson, who holds a similar position in San Francisco, have been named by Charles T. Hutchinson, chairman of the advisory committee of the California Electrical Bureau, as chairmen of committees for southern and northern California, respectively, to assume charge of all organizational work for the participation of the electrical industry in the State of California in the celebration.

The object of these committees will be to create in each community a local sponsoring committee and to enlist in the movement the co-operation of all civic bodies, service clubs and similar organizations.

Elaborate plans are being formulated for the celebration of the Jubilee in Denver by a sponsoring committee consisting of 50 business men, bankers and public officials of that city.

James C. Burger, vice-president of the Denver National Bank, is chairman of the sponsoring commitee; John J. Cooper, manager of the General Electric Supply Company, is general chairman of the Jubilee program, and George E. Lewis, executive manager of the Rocky Mountain Committee on Public Utility Information, is vice-chairman.

San Joaquin Employees Honored for Life Saving

HONORED for life-saving service, seven employees of the San Joaquin Light & Power Corporation, Fresno, Calif., recently were presented with citations by A. G. Wishon, president of the company, and two of them were awarded the President's Medal of the National Safety Council, an honor that is granted only to those who successfully administer artificial respiration.

The employees receiving the awards were Leland H. Lucero, Merced; James Scarborough, Aubrey S. Roughton, Joseph C. Heaslet, Vernard C. Redman, Richard E. Johnson and R. F. Brock, Fresno.

The President's Medal was awarded to L. H. Lucero for saving the life of Roy E. Thomas, a fellow employee who was overcome while making a gas connection under a house, and to James Scarborough who, with A. S. Roughton, rendered aid to Mrs. Margaret Stafford, who was overcome in a fire. Mr. Scarborough applied artificial respiration and revived the patient while Mr. Roughton applied first-aid treatment.

Messrs. Heaslet, Redman, Johnson and Brock were presented with company citations for the successful resuscitation of Ralph R. Anderson, a company garage machinist, who was shocked and burned while attempting to disconnect a motor.

San Joaquin Light and Power Corporation

Citation

For Meritorious Service

THE CENTRAL ACCIDENT PREVENTION COMMITTEE OF THE SAN JOAQUIN LIGHT AND POWER CORPORATION cites for Commendation:

Leland Harold Lucero

Whose prompt and efficient application of artificial respiration was the means of saving the life of ROY ELLIOT THOMAS, who on January 25, 1929, was overcome by gas at Merced, California

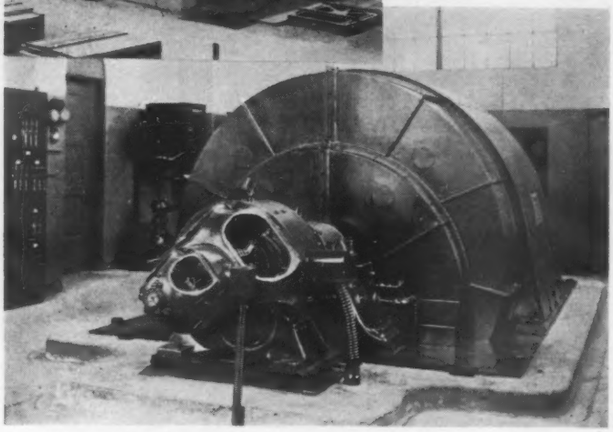
In Recognition

Of this life-saving service, the management of The San Joaquin Light and Power Corporation has caused this certificate of commendation to be inscribed and presented this 24th Day of June, 1929.

PRESIDENT

Above: Citation presented to seven San Joaquin Light & Power Corporation employees for meritorious life-saving service. *At left:* Employees who received awards. Upper row: Vernard C. Redman, Robert F. Brock, J. C. Heaslet and Richard E. Johnson. Lower row: Leland H. Lucero, A. G. Wishon, James Scarborough and Aubrey S. Roughton.

New Midland Counties Substation Dedicated at Luncheon to Santa Maria Residents



Above: New substation of the Midland Counties Public Service Corporation at Santa Maria, Calif., and *below*, the 15,000-kva. synchronous condenser which it houses.

TWO hundred residents of Santa Maria, Calif., were guests of the Midland Counties Public Service Corporation at a luncheon held to introduce George V. Footman, the company's newly appointed manager in that city, and to explain to them the significance of the new $100,000 15,000-kva. synchronous condenser which went into service at the Santa Maria substation April 10.

Al C. Joy acted as master of ceremonies for the occasion and Dunlap D. Smalley, superintendent of distribution for the Midland company, in addressing the luncheon meeting explained that the new installation would do much to iron out voltage fluctuation prevalent on the Coast in the past and caused largely by the doubling of the Midland Counties company's load during the past four years. The Midland Counties company is served by a 110-kv. line operating from the Midland steam plant of the San Joaquin system, the parent company, and a 70-kv. line from the main valley system via Coalinga.

The installation is unique in that all of the switching equipment and bus work is out of doors, the switching equipment being controlled from a small switchboard in the main operating room. The machine operates at 12 kv.

It is housed in a reinforced concrete building equipped with a 30-ton electric crane for handling the heavy members in case of repairs or overhauling. This crane can also be used for pulling the cores of the huge 7,500-kva. transformers used at this substation, rails being laid from the transformer yard into the condenser house.

Since the machine was placed in operation steady voltage has been maintained in the face of unusual load conditions and system disturbances.

Tokyo Ready for Meeting of Engineering Congress

Plans are practically complete for the sectional meeting of the World Engineering Congress to be held in Tokyo, Japan, Oct. 29 to Nov. 22. Technical sessions will be held from Oct. 29 to Nov. 7, and excursions in Japan will take up the remainder of the time devoted to the meeting. Papers to be presented at the sessions treat all phases of power generation, distribution and finance, and will be read by delegates from Japan, the United States, Germany, Czechoslovakia, Switzerland, Denmark, Sweden, Italy and Russia.

President Hoover is honorary chairman of the American committee of the congress, and Elmer A. Sperry is chairman. The American delegation, numbering approximately 250 persons, will sail for Tokyo on Oct. 10 from San Francisco. Two ships, the "President Jackson" and the "Korea Maru," have been chartered specially for transportation of the American delegates.

Municipal Ownership Voted Down in Colorado Town

By a vote of 266 against and 246 for, the voters of Delta, Colo., on July 26, defeated a municipal electric project fostered by Charles Viestenz and associates of Loveland, Colo.

In July, 1928, the City of Delta declined to renew the Western Colorado Power Company's franchise for another twenty years, and since that time the power company has been supplying the city with light and power without a franchise. Mr. Viestenz's proposal was designed to provide the community with an authorized generating plant and distribution system. Under its terms an electric power and light station would have been built by the Viestenz group and operated by them until the cost had been returned in profits, together with 5 per cent interest. At the end of fifteen years, or before if profits warranted, the plant was to become the property of the City of Delta without expense to taxpayers.

Mr. Viestenz is credited with having induced Loveland, Colo., to enter the municipal ownership field several years ago. The experiment is said to have been unsatisfactory. This argument, combined with the fact that Mr. Viestenz recently was removed from Loveland's City Council, tended to dampen the ardor of local municipal ownership advocates, who switched allegiance at the last moment, defeating the measure.

Heavy-Duty Equipment Sale Result of Cooking School

A three-day cooking school staged July 24, 25 and 26 at Atascadero by the Valley Electrical Supply Company, merchandising division of the San Joaquin Light & Power Corporation, Fresno, Calif., and the Midland Counties Public Service Corporation, San Luis Obispo, Calif., under the auspices of the Atascadero News, resulted in the unusually high attendance of 596 persons and the direct sale of eight electric ranges and three electric water heaters.

This is the first time in the history of cooking schools over the Valley Electrical Supply Company's system that direct sales have been made from the floor of the demonstration. H. H. ("Kelly") Courtright, president and general manager of the supply company, believes the sales are a result of a change in policy whereby the merchandising company handled the show without the aid of any particular range manufacturer and showed and demonstrated several different makes of ranges and appliances.

The total of kilowatts resulting from the cooking school was 76. The demonstrations were made by Miss May E. Layton, of the Valley Electrical company's organization, assisted by Miss Scott, Westinghouse home economist. The show was under the supervision of Robert Downing, head of the Valley Electrical Supply Company's range department.

Preliminary Permit Granted for Rock Island Project

Foreshadowing investment of approximately $20,000,000, a preliminary permit has been granted by the Federal Power Commission to the Washington Electric Company, of Seattle, a Puget Sound Power & Light Company subsidiary, for its Rock Island power project on the Columbia River, near Wenatchee, Wash.

Plans for the development of the initial unit, to cost $12,000,000, must wait on the granting of the federal license, W. H. McGrath, vice-president of the Puget Sound Company, stated, but preliminary studies of the situation contemplate erection of a low dam at Rock Island for the generation of 60,000 kw. in the initial unit and transmission of this power to Seattle over two new lines crossing the Cascade Mountains.

Ultimate development of the site, Mr. McGrath said, would entail a probable increased expenditure of about $8,000,000 and would provide for the production of 180,000 kw., to be distributed over the company's system in Seattle and elsewhere in Washington. Under the preliminary permit, Mr. McGrath said, work will be undertaken at once on surveys by United States Army engineers and also by experts of the Puget Sound Power & Light Company, to ascertain probable power development, location of the dam site and other technical data.

Power generated at the Rock Island site would serve the company's eastern district in central Washington, providing a surplus for transmission to the new switching station at Renton for distribution through western Washington, Mr. McGrath said. H. A. Hageman, chief consulting engineer for Stone & Webster of Boston, is at Wenatchee and will have charge of engineering details for the proposed dam. Under present plans the dam will back water five miles above Wenatchee or fifteen miles above the dam.

P. G. and E. Co. Announces New Building Program

Plans for the erection of new buildings in San Francisco to cost approximately $1,000,000 and for the construction of a new substation at Sacramento, Calif., have been announced by the Pacific Gas and Electric Company.

The new buildings in San Francisco will be known as the Pacific Gas and Electric Company's service group and will occupy property recently purchased consisting of the block bounded by Eighteenth, Shotwell, Nineteenth and Folsom Sts. There is to be a new two-story reinforced concrete garage and shop building with basement 245 x 255 ft. It is also planned to remodel the two existing buildings on this property. One of these will be used for warehouse purposes and the other for the gas and electric distribution headquarters. The company's San Francisco meter and transformer shops also will be situated on this property.

Because of the increasing demands for electric service in Sacramento, Calif., and surrounding territory, the Pacific Gas and Electric Company is constructing a new substation at Fourth Ave. and Fifty-second St. in the Vina Vista subdivision just outside of Sacramento's city limits. This new substation will be known as Station "C" and will be a concrete building housing switches, regulators and automatic operating equipment. Primary service will be received from the company's interconnected power system at primary voltages and through the transformer equipment at the station will be reduced to secondary voltages for use of consumers in the territory to be served.

New 22-Kv. Line in Operation by New Mexico Company—The new 22-kv. transmission line erected by the Mesilla Valley Electric Company, between Las Cruces and Hatch, N. M., was placed in service on July 22, several days ahead of the time scheduled for completion of the line.

Issues Sign Advertising Plan Book for Central Stations

The Society for Electrical Development, Inc., New York, has developed for use by central stations a 60-page illustrated booklet entitled, "A Plan to Sell Electrical Advertising." The purpose of the book is, first, to indicate to power companies the value of electrical sign advertising, and, second, to furnish them the technique for developing load through this market.

The information contained in the plan book was prepared by the electrical advertising section of the society in cooperation with the electrical advertising committee of the Commercial National Section, N.E.L.A.

The British Columbia Electric Railway Company, Ltd., is planning the erection of two power lines on Vancouver Island, B. C., to serve the districts of Shawnigan Lake and Cobble Hill. The extensions will be carried on wooden poles and will carry current at 11 kv. and 2 kv., respectively. The work will cost approximately $50,000 and is expected to be completed this fall.

FINANCIAL NEWS

Issue of Edison Company Bonds Authorized

Authority has been granted by the California Railroad Commission to the Southern California Edison Company to issue and sell on or before Dec. 31, 1929, at not less than 94½ per cent of face value, plus accrued interest, $15,000,000 of its refunding mortgage gold bonds, series of 5's, due 1954, and to use the proceeds derived from the sale thereof to refund outstanding 5½ per cent bonds and to reimburse its treasury for capital expenditures.

The commission also has authorized the Edison company, in a supplemental order, to limit the amount of series "C," 5½ per cent preferred stock, sold under the previous authorization of the commission, to 160,000 shares of a total par value of $4,000,000, instead of the original sum of $10,000,000.

Puget Sound Company Reports Greatest Gross Earnings—June of this year brought to a close a twelve-month period of the greatest gross earnings from light and power service in the history of the Puget Sound Power & Light Company, Seattle, the company reports show. Steady increase also was recorded in the number of customers served. Gross earnings for June, 1929, were $1,282,268, an increase of $99,082 over gross earnings for June, 1928. The June earnings brought the total of gross earnings for the year ended June 30, 1929, to $15,717,242, an increase of $743,797 over gross earnings during the twelve months ending June 30, 1928.

Neon Manufacturer's Stock Admitted to Trading—The common stock of the Electrical Production Corporation of Washington, Seattle, has been admitted to trading on the Seattle stock exchange. The corporation is one of the associated Claude Neon companies and holds the franchise covering manufacturing and sale of Neon tubing in Washington, Idaho and Montana. The company has retired its serial gold note and preferred stock issues. It has 100,000 shares of common stock authorized, outstanding and listed. Dividends of $1 per share were paid on common stock June 15.

Tacoma Light System Increases Earnings—The municipal light and power system of Tacoma, Wash., earned during the first six months of 1929 almost $300,000 more than it did during the similar period of 1928 and had net earnings nearly $200,000 greater, the monthly report of the public utilities department for June shows. The system is headed for a $1,000,000 net earnings year, the report declares, the greatest in its history, despite payment of interest and bond retirement, with a net of $568,262.18 already earned.

1929-30 Officials of A.I.E.E. Pacific Coast Sections

ON Aug. 1 the officers and other members of the executive committees of the eight Pacific Coast sections of the American Institute of Electrical Engineers took up their duties for the new administrative year. The names of the men who have shouldered the responsibility for carrying on the work in the various sections follow:

Denver: chairman—W. H. Bullock, consulting engineer; vice-chairman—R. B. Bonney, The Mountain States Telephone & Telegraph Company; secretary-treasurer—N. R. Love, The Denver Tramway Corporation; executive committee—L. N. McClellan, U. S. Bureau of Reclamation; A. L. Jones, General Electric Company; and W. H. Edmunds, Colorado & Southern Railway Company.

Los Angeles: chairman—N. B. Hinson, Southern California Edison Company; secretary—H. W. Hitchcock, Southern California Telephone Company; assistant secretary—P. S. Biegler, University of Southern California; executive committee—F. E. Dellinger, Los Angeles Gas and Electric Corporation; C. E. Johnson, Sterling Electric Motors, Inc.; A. P. Hill, Southern California Telephone Company; and F. W. Maxstadt, California Institute of Technology.

Portland: chairman—H. H. Cake, Pacific States Electric Company; secretary-treasurer—A. L. Kreul, Portland Electric Power Company; executive committee—R. J. Davidson, Pacific Power & Light Company; L. W. Going, City Inspection Bureau; and L. M. Moyer, General Electric Company.

San Francisco: chairman—Dr. L. F. Fuller, Federal Telegraph Company; vice-chairman—P. B. Garrett, Westinghouse Electric & Manufacturing Company; secretary—G. R. Henninger, "Electrical West;" executive committee—A. V. Gullou, California Railroad Commission; and E. F. Maryatt, Pacific Gas and Electric Company.

Seattle: chairman—Dr. L. N. Robinson, Stone & Webster Engineering Corporation; secretary—G. S. Smith, University of Washington; executive committee—C. R. Wallis, General Electric Company; A. F. Darland, Utilities Department, City of Tacoma; C. E. Mong, The Pacific Telephone and Telegraph Company; G. E. Quinan, Puget Sound Power & Light Company; G. S. Smith, University of Washington; and T. S. Wood, manufacturer's agent.

Spokane: chairman—Earl Baughn, The Washington Water Power Company; vice-chairman—J. B. Fisken, The Washington Water Power Company; secretary-treasurer—C. B. Carpenter; executive committee—W. M. Allen, Home Telephone & Telegraph Company; L. R. Gamble, The Washington Water Power Company; H. L. Vincent,

General Electric Company; and Bernhard Olsen, General Electric Company.

Salt Lake City: chairman—A. C. Kelm, Utah Power & Light Company; secretary-treasurer—L. B. Fuller, Utah Power & Light Company; executive committee—C. B. Shipp, General Electric Company; R. W. McNeill, Westinghouse Electric & Manufacturing Company; A. W. Duste, Mountain States Telephone & Telegraph Company; Paul Ransom, Utah Apex Mining Company; and E. L. Dee, General Electric Company.

Vancouver: chairman—John Teasdale, British Columbia Electric Railway Company; secretary—Douglas Robertson, Canadian General Electric Company; executive committee—C. W. Colvin, British Columbia Electric Railway Company; G. R. Wright, Canadian General Electric Company; and Dr. Herbert Vickers, University of British Columbia.

P. C. E. A.

Mrs. Letchworth Now Heads Women's Committee

Mrs. Nyra G. Letchworth, of the San Joaquin Light & Power Corporation, Fresno, Calif., has been appointed chairman of the women's committee of the Public Relations Section, P.C.E.A., for the year 1929-30.

MRS. NYRA G. LETCHWORTH

Mrs. Letchworth is thoroughly familiar with the work of the women's committee. For the past five years she has served as chairman of the women's committee of the San Joaquin Light & Power Corporation and Midland Counties Public Service Corporation, and last November she was appointed vice-chairman of the P.C.E.A. women's committee.

To Serve on National Women's Committee—Mrs. Ruth E. Creveling, past chairman of the women's committee of the Pacific Coast Electrical Association, has been appointed Pacific Coast representative of the national women's committee, N.E.L.A. Mrs. Creveling also has been named vice-chairman of the national women's committee. The appointment was made by Harry Reid, chairman of the Public Relations National Section. Mrs. Creveling is editor of the "News Meter," employee publication of the San Diego Consolidated Gas & Electric Company, San Diego, Calif.

News Briefs

Department of Interior Plans Town at Boulder Dam—Plans are being drawn in the Department of the Interior for a town to be built on the brink of the Colorado River for the housing of the workmen who will construct the Boulder Dam, and of their families. The site of the town, which was selected by Secretary of the Interior Wilbur and Dr. Elwood Mead, Commissioner of Reclamation, is on the Nevada side of the river on the nearest level land a little more than a mile from the dam site. Experts are working on details intended to make the proposed town a model community and a permanent one which is expected to continue even after the construction period has passed.

Washington Power Company to Construct New Transmission Line—The Western Washington Electric Light & Power Company, Montesano, Wash., will proceed immediately with construction of its new high voltage electric transmission line between Aberdeen and Raymond, Wash., with a branch to the new North River hydro-electric plant. The transmission line will run 25 miles direct from Raymond, with the branch 5½ miles additional. The line will be built entirely on steel towers and steel poles, and 150,000 lb. of copper wire will be used.

City of Kelso, Wash., Offered Rate Reduction by Utility—A reduction of approximately 4 mills in the power rate for the Kelso, Wash., city pumping plant, and of 26 cents per month for each suspension light, has been offered the City Council by the Puget Sound Power & Light Company. Kelso at present pays 1.6 cents per kw.-hr. for the pumping plant and $1.55 for each of the 210 suspension lights. The reduction also provides for a discount of 5.5 mills on all power over 200-hp. demand.

New Substation to Be Built at North Vancouver, B. C.—The British Columbia Electric Railway Company has announced its intention of building a new substation at North Vancouver, B. C. The new station will be erected on Third and St. David Sts., and will be adjacent to the existing substation. The project is estimated to cost $84,000. The existing substation will furnish power only for the electric street railway, while the new substation will take care of light and power requirements. The light and power distribution capacity will be increased by a new switching installation with a capacity of 4,200 kw. instead of 1,500 as at present. The distribution voltage will be increased from 2.3 to 4 kv. The substation will be of reinforced concrete construction.

City of Tacoma Sues to Condemn Land for Cushman Power Project—A condemnation suit has been launched by the City of Tacoma in Mason County, Wash., with the purpose of taking over almost 60 acres of state land for use in the development of the second unit of the Cushman power project. Papers filed in the suit by E. K. Murray, corporation counsel, declare that Tacoma now urgently needs more electric energy than is provided by the existing unit, and the city will find it necessary to purchase energy or manufacture it in a steam plant at exorbitant cost until the additional unit is available. The property involved is along the shores of the Skokomish River, the waters of which are to be used in the development.

City of Seattle Applies for Additional Water for Skagit Project—Request for permission to appropriate additional water from the Skagit River has been filed with the State Hydraulics Supervisor by the City of Seattle. The application asks for the use of an additional 1,000 sec.-ft. for the Gorge plant, which would increase the present output by 43,875 hp., and an additional 700 sec.-ft. for the Diablo plant, which would increase its output by 23,182 hp., a total increase of 67,057 hp. It was shown that the additions planned would not exceed the original estimate of $10,000,000 for the Gorge project and $8,000,000 for the Diablo project.

Mountain States Company Increases Capacity of Coos Bay Steam Plant—Construction work is under way on the 10,000-kw. addition to the Mountain States Power Company's Coos Bay steam plant at North Bend, Ore. It is scheduled for completion by July 1, 1930. This addition, which will increase the capacity of the present station from 5,000 to 15,000 kw., will include one 10,000-kw. turbine with two boilers of suitable capacity.

Seattle Council Increases Light Department Appropriation—The Seattle City Council has increased to $375,000 the general fund appropriation in the 1930 budget as compensation to the City Light Department for maintenance of the street lighting system, despite the recommendation of Mayor Frank Edwards that the appropriation be cut to $25,000. Councilman Case, in defense of the appropriation asked, declared that "the rates paid by other Pacific Coast cities for street lighting are two or three times greater than Seattle is paying."

Utility Granted New Franchise for Sale of Power in Tacoma—Application of the Puget Sound Power & Light Company for a new franchise to sell power in Tacoma for the next 25 years has been received by the City Council and referred to Commissioner Ira S. Davisson for a report. The latter has expressed an opinion that the traction franchises in Tacoma, owned by interests allied to those in the power company, should be settled at the same time with the power franchise.

Condemnation Proceedings Against Grays Harbor Distributing System Authorized by City of Aberdeen—The City Council of Aberdeen, Wash., has authorized condemnation proceedings against the Grays Harbor Railway & Light Company's distributing system in that city, and has directed the city attorney to draw up an ordinance authorizing acquisition of the system, and to bring suit without delay.

Colorado Utilities' Meeting Date Changed—The joint meeting of the Rocky Mountain Division, N.E.L.A., and the Colorado Utilities Association will be held in Glenwood Springs, Sept. 2-4, 1929, instead of Sept. 9-11, as announced in Electrical West, July 1.

Coming Events

American Institute of Electrical Engineers—Annual Pacific Coast convention in Santa Monica, Sept. 3-6, 1929.

Association of Electragists, International—Annual convention in Swampscott, Mass., Sept. 30-Oct. 4, 1929.

Illuminating Engineering Society—Annual convention at Bellevue-Stratford Hotel, Philadelphia, Sept. 24-27, 1929.

International Association of Electrical Inspectors, Northwest Section (formerly Northwest Association of Electrical Inspectors)—Annual convention in Vancouver, B. C., Sept. 9-11, 1929.

Southwestern Section (formerly California Association of Electrical Inspectors)—Annual convention in San Francisco, Calif., Sept. 18-20, 1929.

Pacific Coast Electrical Association—Engineering Section meeting in San Francisco, Sept. 18-20, 1929.

Rocky Mountain Division, N.E.L.A.-Colorado Utilities Association—Joint meeting in Glenwood Springs, Colo., Sept. 2-4, 1929.

World Engineering Congress—Tokio, Japan, beginning Oct. 30, 1929.

Officers Elected by Utah Engineers—The official personnel of the Utah Society of Engineers, chosen at the recent annual election, is made up as follows: president—H. S. Kerr; vice-president—C. H. Jones; secretary—Ralf R. Woolley; treasurer—R. K. Brown. Arthur Erickson was made a member of the executive committee.

San Diego Council on Food Preservation Organized

The San Diego Food Preservation Council was organized Aug. 2 with the following local officers prepared to co-operate actively in carrying out the national program: chairman—G. H. P. Dellmann, San Diego Consolidated Gas & Electric Company; treasurer—L. A. Bird, Union Ice Company; secretary—Forrest M. Raymond, San Diego Consolidated Gas & Electric Company; members of the executive council—W. H. Hermes, O'Keefe and Merritt, dealers; Douglas Young, Qualitee Dairy; J. P. Thomas, Grand Rapids Furniture Company; and J. D. Pritchard, Chamber of Commerce.

In the canvass of the milk industries, furniture delears and mechanical refrigerator companies, the San Diego Council is meeting with enthusiastic support. Considerable attention is to be given the program at the annual San Diego County Fair, Sept. 10-14.

Los Angeles Water and Power Commissioners Organize for Ensuing Year—Judge Harlan G. Palmer, Hollywood, Calif., newspaper publisher, appointed by Mayor John C. Porter of Los Angeles to the Board of Water and Power Commissioners, was elected president of the board when it organized July 26 for the forthcoming year. He succeeds John R. Richards as president. Dr. John R. Haynes was elected vice-president to succeed Senator R. F. Del Valle, a member of the commission for 21 years, whose last five-year term of membership has expired. Judge Palmer replaced Senator Del Valle as a member of the board. William P. Whitsett and Will E. Keeler also are members.

Meetings

Colorado League Enjoys Ninth Annual Picnic

High-voltage fun with alternating currents of athletic contests, prize drawings, dancing and theatrical entertainment made up the Electrical League of Colorado's ninth annual picnic at Elitch's Gardens in Denver.

Nearly 1,500 Electragists, central station men, distributors and manufacturers within the industry, and their families participated in the celebration where more than 100 prizes changed ownership and motion pictures of the crowd were taken.

A feature of the occasion was the free airplane ride given finders of blue tickets dropped from overhead by a speeding plane. Orville J. Willoughby, president of the National Air College and Wesco Manufacturing Company of Denver contributed this part of the entertainment.

J. W. Ryan, chairman, C. S. Newell, E. E. Stettler, and J. S. Veatch comprised the arrangements committee.

Yes, Yes, Your Honor!

You,
are charged with being absent from
last week's meeting of the
Electric Club of San Diego
DON'T LET THIS HAPPEN AGAIN
ELECTRIC CLUB OF SAN DIEGO

THE membership committee of the Electric Club of San Diego devised this card which neatly and humorously makes its point, and has proved a great aid in stimulating regular attendance. A further evidence of the wide-awake quality of this club is its "Host Card." This is sent to each guest who has attended one of the club's meetings and cordially invites him to repeat his visit.

Personals

Grays Harbor Co. Appoints Successor to G. B. Sanford

L. G. McClellan, for the past four years purchasing agent for the Grays Harbor Railway & Light Company, Aberdeen, Wash., has become secretary and assistant treasurer of the Grays Harbor company and officer in its subsidiaries. In addition to his new duties he will retain his position as purchasing agent. Mr. McClellan succeeds G. B. Sanford, who has resigned

L. G. McCLELLAN

to become treasurer of the "Business Chronicle" in Seattle.

Mr. McClellan has had a wide experience in the public utility field. He first went to Aberdeen in 1910 as manager of the Pacific Telephone & Telegraph Company, and following the completion of his managership there in 1911, he served as district superintendent both in Everett and Seattle. While in that city he resigned from the telephone company after an association of seventeen years, and spent three years in Alaska where he was interested in a fish packing concern, returning to Aberdeen in 1918.

In addition to his business activities in Aberdeen, Mr. McClellan has been active in civic work and city politics. He served three terms on the City Council, and now is president of the Washington League of Municipalities, which he helped to reorganize.

D. H. O'Brien and **Herbert Metz**, merchandise manager and sales promotion and advertising manager, respectively, Graybar Electric Company, Inc., New York, recently completed a tour of Pacific Coast cities. They were accompanied by **William H. Beatty**, vice-president, and **Fred T. Weeks**, Pacific Coast representative, Newell-Emmett Company, New York, advertising agency for the Graybar products.

New Chairman Appointed for Oregon Commission

APPOINTED by Governor Patterson to fill the vacancy on the Oregon Public Service Commission caused by the death of Louis E. Bean, Frank

FRANK MILLER

Miller, Albany, Ore., has been elected chairman. At a meeting of the commission immediately following his appointment Mr. Miller was elected to the position occupied by Mr. Bean at the time of his death.

In taking up his new duties Mr. Miller carries with him a wide experience, for he served as the first secretary of the original State Railroad Commission from 1891 to 1893. At the general election in the fall of 1909 he was elected to serve as a member of the Railroad Commission of Oregon. Oswald West, who was a member of the commission, resigned, because of his election as governor, and Mr. Miller was appointed to serve out Mr. West's unexpired term. In January, 1910, he took the office of commissioner to which he previously had been elected, and served continuously until January, 1919.

Mr. Miller also served in the Oregon legislature as joint senator from Marion and Linn Counties, and subsequently for Linn and Lane Counties, from 1906 to 1910.

F. R. George Is Advanced by P. G. and E. Company

EFFECTIVE Aug. 1, F. R. George, since 1920 engineer of operations for the Pacific Gas and Electric Company, with headquarters in San Francisco, has been appointed engineer of electrical operation in charge of operation and maintenance of the company's electric, water, and steam properties, and of general line construction. The promotion was earned by Mr. George through his executive ability displayed in the operation of one of the largest interconnected hydro-electric systems in the world, according to the company's announcement, as well as his intimate knowledge of the company's properties gained through 28 years of service.

Mr. George began his career in the electrical industry as an operator for the Mutual Electric Light Company in San Francisco. About 1901 he was employed by the Bay Counties Power Company as an operator and later served as construction electrician, substation foreman, and district foreman for that company, which eventually became a part of the Pacific Gas and Electric Company. In 1906 Mr. George was given the title of load dispatcher and pioneered in the organizing of the company's load dispatching system, which has developed into an essential part of the company's extensive electric operations. He continued in that position until 1920 when he was placed in charge of the operation of the electric properties with the title of engineer of operation.

For years Mr. George has taken keen

F. R. GEORGE

interest in technical matters, having served on national committees of both the National Electric Light Association and the American Institute of Electrical Engineers, and, as chairman of the San Francisco Section, A.I.E.E., was one of the organizers of the San Francisco Engineering Societies Employment Service. At the present time he is chairman of the Engineering Section of the Pacific Coast Electrical Association.

Dr. F. W. Vincent, since 1910 district manager at Pendleton, Ore., for the Pacific Power & Light Company, has retired. For more than 40 years he has been actively engaged in the promotion and management of the central station industry in Pendleton, having served as president of the Pendleton Electric Light & Power Company from July, 1888, until February, 1904, when the property was acquired by the Northwestern Gas & Electric Corporation. He remained as manager of the company until the property passed to the ownership of the Pacific Power & Light Company in 1910. W. H. Till, formerly district manager at Goldendale, has been named to succeed Dr. Vincent; R. H. Hopper has been transferred from the district managership at Pomeroy to fill the position left vacant by Mr. Till; and L. W. Dick, formerly chief clerk at Lewiston, has been made district manager at Pomeroy.

Thor Representative in West Now Company Officer

FOR many years representative in Oregon and Washington of the Electric Household Utilities Corporation, Chicago, and of its predecessor, the Hurley Machine Company, R. G. Chamberlain has been appointed vice-president of the company and placed in charge of sales in the eleven Western states.

Mr. Chamberlain joined the sales organization of the Hurley Machine Company, makers of Thor washers and vacuum cleaners, in February, 1916, and for some time was the sole factory representative in Oregon and Washington, making his headquarters in Seattle. With the coming of the "Thor" shops and the consequent enlarging of the sales organization in the territory, he was made district manager for the two states. His appointment as vice-president of the Electric Household Utilities Corporation and his enlarged territorial responsibility became effective July 1.

R. G. CHAMBERLAIN

John L. Busey to Join G-E New England Distributor

JOHN L. BUSEY, for the past four years assistant to the president, Pacific States Electric Company, San Francisco, is leaving the West on Sept. 7 to become manager of the New England Division, General Electric Supply Corporation, with headquarters at Boston, Mass. The General Electric Supply Corporation is the General Electric distributing organization serving the greater part of New England, with offices and warehouses at Boston and Springfield, Mass., and Portland, Maine.

Mr. Busey has spent his entire career in the electrical industry, and has always been connected with distributors of General Electric products. At an early age he worked as a journeyman electrician's helper for one and a half years at Montrose, Colo. Subsequently he became a wireman, and has had experience also as an electrical contractor-dealer. From 1909 to 1919 he was in the employ of the Capital Electric Company, Salt Lake City. From office boy he rose to be a salesman and finally manager of several of the company's branches in the states of Utah and Idaho. From 1919 to 1925 he served as manager of the Butte Electric Supply Company, General Electric merchandise distributor for Montana and parts of Wyoming and Idaho.

JOHN L. BUSEY

Mr. Busey leaves behind him a wide acquaintance and a host of friends made during the 22 years that he has spent in the Inter-Mountain states and on the Pacific Coast.

Daniel Torrance, formerly secretary to **A. W. Leonard,** president, Puget Sound Power & Light Company, Seattle, has been made assistant to the president. Mr. Torrance has been associated with Stone & Webster interests for fifteen years and went from Boston to Seattle about four years ago to take the position of assistant comptroller, Puget Sound Power & Light Company.

Leslie T. Clawson, for the past seven years in the employ of the Puget Sound Power & Light Company, Seattle, has resigned to take charge of sales promotional work for Gordon-Prentice, Inc., distributor of General Electric refrigerators in western Washington.

P. M. Parry, vice-president and commercial manager, Utah Power & Light Company, Salt Lake City, has been appointed regional director for the National Food Preservation Council, and **C. N. Malouf** has been made director for Salt Lake City. **R. G. Kenyon,** assistant advertising manager, Southern California Edison Company, Los Angeles, is another member of the electrical fraternity who is a regional director for the National Food Preservation Council. All are busy with plans for September, which has been scheduled as food preservation month.

R. H. Ballard, president of the Southern California Edison Company, Los Angeles, recently returned to California from Europe where he has spent the past three months.

Ray P. Gordon, formerly associated for seven years with the Valley Electrical Supply Company, Fresno, Calif., has joined the San Francisco organization of Curtis Lighting, Inc., as sales engineer. Mr. Gordon will be associated with **R. D. Myers,** resident engineer, at 414 Foxcroft Building.

Ralph O. Waltham, for the past seven years assistant engineer in the gas and electric division of the engineering department of the California Railroad Commission, has resigned to become managing editor of "Electric Light and Power," Chicago.

Harold B. Smith, president, American Institute of Electrical Engineers, made the Pacific Coast convention of the Institute at Santa Monica, Calif., Sept. 3-6, the opportunity for a tour of Pacific Coast cities before his arrival in southern California. Mr. Smith is professor of electrical engineering at Worcester, Mass., and a consulting engineer for the Westinghouse Electric & Manufacturing Company, East Pittsburgh. He has been engaged in high voltage research work for the past 35 years, and the results of some of his experiments were told in an address, entitled "The Quest of the Unknown," which he delivered before section meetings of the Institute in many of the Western cities he recently visited.

Miss Edith Hedger has been named chairman of the women's committee of The Washington Water Power Company, succeeding **Miss Mary K. Walsh,** who is now a member-at-large of the national women's committee.

L. W. Ross, an engineer with The Pacific Telephone and Telegraph Company, Seattle, recently spent ten days in San Francisco in conference with officials of the telephone company in that city on matters pertaining to the company's educational work.

Obituary

O. W. Carl, secretary of the San Diego (Calif.) Electrical Contractor-Dealer Association, died suddenly Aug. 2. Mr. Carl, an Electragist, had taken an active part in the affairs of the electrical organizations of San Diego and had been appointed by the City of San Diego to act on a board of freeholders in the preparation of a new city charter. No successor has yet been appointed to fill his place in the contractor-dealer organization.

William Piggott, chairman of the board of the Pacific Coast Steel Company, whose plants are in Seattle, Portland and San Francisco, died in Vancouver, B. C., on July 19, at the age of 69 years. Mr. Piggott, who had been one of the industrial leaders in Seattle for 35 years, served as president of the Pacific Foreign Trade Council from 1925 to 1928.

Tentative Programs of Two Inspectors' Conventions Announced

DISTINGUISHED by the number of prominent figures in the inspection and code development phases of the electrical industry who will attend and make addresses, the two conventions of electrical inspectors on the Pacific Coast give promise of being noteworthy events. Controversial phases of codes and ordinances and wiring restrictions are promised an airing which should bring out active discussion at both conventions.

The two conventions follow each other in close succession. That of the Northwest Section of the International Association of Electrical Inspectors will be first. It is to convene at Hotel Vancouver, Vancouver, B. C., Monday, Tuesday and Wednesday, Sept. 9, 10, and 11. That of the Southwest Section, although the meeting place has been moved from Sacramento to Hotel Whitcomb, San Francisco, will retain the same dates, namely, Wednesday, Thursday and Friday of the next week, Sept. 18, 19 and 20.

The program for the Northwest Section convention was announced by President H. A. Patton to be as follows:

Northwest Section Annual Meeting Program

Monday, Sept. 9, 1929

10 a.m.—Call to order by President H. A. Patton.

Addresses of Welcome—By W. H. Malkin, mayor of Vancouver, B. C., and W. G. Murrin, president, B. C. Electric Railway Company, Ltd.

Responses—By J. C. Forsyth, president, I.A.E.I., and L. W. Going, chief electrical inspector, Portland, Ore.

11 a.m.—Roll call. Secretary-treasurer's report. President's report. Appointment of special committees. Announcements.

12 M.—Luncheon for all members, ladies included, at Vancouver Electric Club.

1:15 p.m.—Photograph on courthouse steps.

1:45 p.m.—Paper on "Reinspections," by Robert L. Laing, fire marshal, City of Seattle.

Discussion—L. W. Going, chief electrical inspector, Portland.

2:45 p.m.—Report of standing committees.

3:30 p.m.—Paper on "Reasons for Grounding, by Dr. M. G. Lloyd, engineer, Bureau of Standards, Washington, D. C.

Discussion headed by S. B. Clark, underground engineer, Northwest Electric Company, Portland.

Monday Evening—Entertainment for the ladies.

Tuesday, Sept. 10, 1929

9 a.m.—Standing committees.

10 a.m.—Paper on "Armored Cables," by A. Penn Denton, engineer, N.E.M.A., New York City.

Discussion—By Bill Meacham, Meacham & Babcock, electrical contractors, Seattle.

10:45 a.m.—"Duties of the Electrical Field Engineer," Victor H. Tousley, electrical field engineer, N.F.P.A., Chicago, Ill.

11:15 a.m.—"Our Inernational Association," by J. C. Forsyth, president, I.A.E.I., New York City.

Tuesday Afternoon — Entertainment. Golf tournament. Trophy for winner. Trip to Grouse Mountain.

Electragist Leaders

Laurence W. Davis, manager of the Association of Electragists, International, heard the good news of Oregon Electragists' activities on arriving at Portland. John R. Tomlinson, field secretary of the Oregon Electragists, had much good work to report.

Southwest Inspectors Move Convention to San Francisco

Because all the major hotels in Sacramento will be filled during the week of Sept. 16, on account of a postmasters' convention, a specially called meeting of the executive committee of the Southwestern Section, International Association of Electrical Inspectors (formerly the California Association of Electrical Inspectors) decided to move the convention to the Hotel Whitcomb, San Francisco, the dates to remain the same.

The convention therefore will be held at the Whitcomb Hotel, San Francisco, Sept. 18, 19 and 20, according to C. W. Mitchell, secretary. Reservation at this hotel should be made instead of at Sacramento hotels as previously announced.

Wednesday, Sept. 11, 1929

9 a.m.—Address by William S. Boyd, secretary, Western Section, I.A.E.I., Chicago, Ill.

9:30 a.m.—Paper, "Is Cheaper Wiring Necessary or Desirable?" by Col. H. S. Bennion, director of engineering, N.E.L.A., New York City.

Discussion—C. H. E. Williams, C. H. E. Williams Company, Ltd., Vancouver, B. C.

11 a.m.—"The Standard Ordinance"—Harry B. Kirkland, director, uniform ordinance department, S.E.D., New York City. Luncheon.

1:30 p.m.—Address by Dana Pierce, president, Underwriters' Laboratories, Inc., Chicago.

2 p.m.—Question box. Report of standing committees. Report of unfinished business. Adoption of new constitution and by-laws. Report of temporary committees. New business. Adjournment.

7 p.m.—Banquet. "Whoopee." Ladies included.

9-12—Dancing (informal).

Southwest Section Tentative Program

Although details as to time and placement on the program had not yet been completed the chief attractions of the Southwest Section convention were definitely known at the time of going to press. Many of the distinguished speakers at the Northwest Section convention were also programmed for the Southwest meeting and still others not definitely programmed were known to be coming to the meetings.

Dr. M. G. Lloyd, chief of the Section of Safety Engineering, Bureau of Standards, Washington, D. C., was scheduled to give his talk to the southern meeting.

J. C. Forsyth, president of the I.A.E.I., likewise was scheduled for his address. Victor H. Tousley, N.F.P.A. field secretary, was also programmed.

In addition to these and possibly some other addresses which are also scheduled for the Northwest Section, several other features have been promised the Southwest Section.

W. S. Boyd, secretary of the Western Section, and a vice-president of the I.A.E.I., has aroused curiosity with the title for his talk, "Chickens Come Home to Roost."

James S. Mahan, Western Actuarial Bureau, Chicago, will speak on the membership question.

Local features include a discussion of "Traffic Control and Traffic Signals," by Ralph Wiley, chief of the department of electricity, San Francisco. Harold L. Gerber, San Francisco inspector, will talk on "The Problems of a Field Inspector."

As usual one of the most popular and instructive parts of the program should be the round table discussion, with R. H. Manahan, chief, department of electricity, Los Angeles, at the "stop and go signal." Besides this George Kimball is arranging for a safety demonstration and the California Railroad Commission has been asked to send a representative to discuss its new order just issued concerning service requirements.

Entertainment for the ladies will be well taken care of and a special attraction of a totally new character is being rehearsed for the convention banquet on Friday evening.

The Tacoma Electrical Contractors Association is functioning in good style with **Bert Noll, Co-operative Electric Company**, as president. **Mrs. Gibbens**, of the **Ajax Electric Company**, is secretary and **Mr. Beckman** is treasurer. Meetings are held once a month and an educational program on estimating and accounting is being carried on. The new Tacoma ordinance recently passed was sponsored by this organization.

Two San Francisco Firms Consolidate

Consolidation of the Atlas Electric Company and the Schultz-Morris Electric Company of San Francisco, was announced recently by the proprietors of both shops. The new firm will be known as the Atlas Electric & Engineering Corporation.

The Atlas Electric Company has been owned by Charles Shipman and E. W. Lauer, while the Schultz-Morris has been owned by F. W. Schultz and L. R. Morris. The latter was formerly located at 310 Fouth St., San Francisco, but will move to the more spacious quarters of the Atlas at 343 Fourth St.

Officers of the new organization are: Charles Shipman, president and general manager; F. W. Schultz, vice-president; L. R. Morris, second vice-president; and E. W. Lauer, secretary and treasurer.

The new firm will combine the forces of two diversified shops, one that has specialized in house and apartment wiring and fixture manufacture, and the other a motor shop and industrial wiring establishment. Under the consolidated form a complete electrical service from house wiring to industrial is planned, each department under the guidance of a specialist in that type of work. Economy in overhead as well as in sales and management are expected under the new arrangement.

Hume & Rumble, electrical contractors of Vancouver and New Westminster, B. C., recently completed the wiring of the new wing of the Empress Hotel at Victoria. Another big job recently undertaken was at the mental hospital at Essondale. In New Westminster the Pacific Terminals cold storage plant was another large installation. This company also is engaged in constructing two pole lines, one for the Canadian Utilities Company from Nanaimo to South Wellington on Vancouver Island. This line is on 60 and 75-ft. poles and operates at 23,000 volts over No. 1/0 aluminum steel core cable. It is twelve miles long and connects with the Canadian collieries on the island. The other line is for the B. C. Telephone Company from Whitecliff to Brittania Mines.

H. D. Mainwaring & Company, electrical dealers, have opened their establishment at 615 Fort St., Victoria, B. C., after extensive alterations. The premises were closed for some time to facilitate this work. The firm was originally established in Victoria under the name of Fox & Mainwaring.

Sid Coates, of the **Coates Electric Company,** First Ave. South, Seattle, was recently elected president of the **Allied Master Electricians Association** in that city. **J. C. Atkinson** was named secretary.

State Motor Section Meeting to Be in San Francisco Sept. 5

The second annual state meeting of the Motor Section, California Electragists, is to be held in San Francisco, Sept. 5. Motor dealers and specialists from all parts of the state will attend and discuss motor market problems and policies and determine plans for the year.

Special Provisions of the National Electrical Code, 1929 edition, dealing with wiring for appliance use, have been put out in pamphlet form by the Edison Electric Appliance Company and given nation-wide circulation among contractor-dealers, utilities and the industry generally. These have to do with changes in Article XVI, making provisions for appliance branch circuits of various capacities.

W. Jamieson, inspector, city electrical staff, Revelstoke, B. C., and an international ski jumping champion, had a close escape from death recently when he contacted with a live 2,200-volt wire. He escaped with serious burns, but will recover.

Walter Joslyn, proprietor of the **Joslyn Electrical Store** at Oroville, Calif., has just finished revamping his entire store, adding 20 ft. of depth to it. A supply room and shop in the rear is also being added. One of the merchandising ideas used by Mr. Joslyn is the ranging along the rear wall of a number of niches in which individual appliances such as ranges, refrigerators, etc., may be displayed to particular advantage. Mr. Joslyn carries quite a complete line of art goods and glassware which is to be displayed to better advantage in the new arrangement. Space will be devoted to the display of fixtures also. One of the front windows has been cut to the floor level in order to make better display of refrigerators and heavier appliances.

George Foss, prominent Electragist of Sacramento, recently erected a building of his own at 1720 Eighth St., where shop facilities and offices are combined. His offices were formerly located in the Ochsner Building, and his warehouse at his home. The new set-up gives him warehouse, shop and offices and ample facilities for construction work at one convenient location.

The City of Renton, Wash., has awarded to **Ne Page-McKenny Company** of Seattle a contract for installation of a street lighting system. The work will cost approximately $10,000.

Seattle Contractors Gambol on the Green

Whenever the Seattle Electric Club pulls a tournament, which is often, the contractors' bloc usually takes plenty of prize plunder of one kind or another. And no wonder. The picture tells the story. Still able to stand from left to right are: William ("Bill") Meacham, Meacham & Babcock; Julius Hooper, Rainier Electric Company; Grover Burke, City Electric & Fixture Company; O. A. Carlson, O. A. Carlson Electric Company; F. W. ("Pete") Rust, of F. W. Rust & Company; George Thirsk, electrical engineer. Too tired are Frank Steel, of Steel & Phelps, and Rees Evans, of the City Electric & Fixture Company.

Manufacturer & Distributor

Parker Electrical Mfg. Co. Succeeds Double "D"

The Parker Electrical Manufacturing Company has been organized to succeed the Double "D" Electrical Manufacturing Company, Third and Washington Sts., Oakland, Calif.

Charles F. Parker, formerly manager of the Western Safety Manufacturing Company and Brown & Pengilly, San Francisco, is president of the new concern, and P. De Bernardi is vice-president. Mr. De Bernardi was formerly in charge of the sheet metal department of the Western Safety Manufacturing Company and the Diamond Electrical Manufacturing Company, San Francisco.

The Parker company will manufacture safety switches, panel boards, switchboards, and other electrical equipment.

Hoover Company to Hold Thirteen Conventions

Thirteen sectional conventions, each of two days' duration, are being held this year by The Hoover Company, manufacturer of Hoover Electric Cleaners, for the most part in those cities where The Hoover Company maintains branch headquarters. On the Pacific Coast conventions will be held in Seattle Sept. 2-3, and in San Francisco Sept. 5-6.

The first day at each of the conventions is open to all those engaged in Hoover sales and service work, and on the second day strictly managerial problems are considered with only managers and supervisors in attendance.

Joins Sales Staff of Wesix, Inc.—Lawrence A. Krieg, formerly a sales engineer with the Pacific Gas and Electric Company in Sacramento, Calif., has joined the factory staff of the South Wesix Heater Company, Los Angeles, and will represent the company in southern California and Arizona.

Heater Company Opens San Francisco Office—The Electric Heating & Manufacturing Company, with offices iin Seattle, Portland and Los Angeles, has opened an office at 557 Market St., San Francisco, with H. E. Smith in charge.

Jones-Lyman to Distribute Products of Three Manufacturers—Jones-Lyman & Company, Inc., of Los Angeles and San Francisco, have been appointed Pacific Coast and Arizona representatives by the **Potosi Tie & Lumber Company,** Dallas, Texas, who maintain a creosoting plant at Denison, Texas. **The Chapman Valve Company,** Indian Orchard, Mass., and the **Pacific Wire Rope Company,** Los Angeles, have appointed Jones-Lyman & Company as their representatives in the state of Arizona.

Agent Appointed for Linemen's Equipment—Ned Licht, of Scaramento, Calif., has been appointed general Western agent for Vacuum Grip linemen's and electricians' pliers manufactured by the **Forged Steel Products Company,** Newport, Pa. The pliers will be distributed in the West by the **Western Hardware & Tool Company,** Sacramento.

STUBBS Electric Company, oldest electrical jobbing house in Portland, moved recently into this new building at Park and Couch Sts. The facilities afforded for speed and efficiency in handling supplies in and out of the building have been the subject of much enthusiastic comment in the jobbing field. The company has discontinued its retail business and is devoting its entire efforts to the wholesale distribution of electrical supplies and radio.

Harry H. Daley Now With Hoffman Specialty Co.

The Hoffman Specialty Company, Waterbury, Conn., has appointed Harry H. Daley, formerly vice-president and director of sales for the Majestic Electric Appliance Company, Inc., San Francisco, as manager of its electric heating division. Mr. Daley will have charge of the marketing of the Thermador, an electric room heater designed in the form of an occasional table, which is being introduced by the Hoffman company in the Western states. He will maintain his headquarters at the Los Angeles offices of the Hoffman Company, 816 West Fifth St.

HARRY H. DALEY

Thomas A. Fawell has been appointed San Francisco Bay district representative of the company and will supervise the marketing of the heater in that section. Offices have been established by Mr. Fawell at 557 Market St.

Distributor for Heat Control Devices Appointed—The Sierra Equipment Corporation, with offices in San Francisco, Los Angeles and Seattle, has been appointed Pacific Coast representative of **The Hart Manufacturing Company,** of Hartford, Conn., manufacturer of remote control and other types of switches for electric ranges and other appliances.

The Northern Electric Company has opened a new warehouse and office building in Vancouver, B. C. It is a four-story concrete building, with foundation provision for three extra floors, the present floor space being 36,000 sq.ft.

Stock Window Display Contest—The Automatic Electric Heater Company, Philadelphia, Pa., is offering a prize of $25 to any dealer or utility showing the most attractive display made of three window cut-outs which the company will supply to anyone wishing to make use of these pieces of display material.

No Time Lost In Covering His Territory

SI LARSEN, sales representative in the Northwest of the Line Material Company, South Milwaukee, Wis., is using this plane to cover his territory in Oregon, Washington and British Columbia. The use of this method of transportation makes Mr. Larsen independent of train, bus or air transport schedules, and permits him to travel between the widely scattered towns in his territory between the close of one business day and the commencement of the next. He reports that there are good landing fields at every town he makes, and he expects to cover 50,000 miles per year by air.

The plane is a Waco 10 equipped with a Wright Whirlwind motor, and will carry two passengers besides the pilot. Before the issuance of a commercial flying license to Mr. Larsen, the company secured the services of Roy B. Ormond, army and commercial pilot, who made the territory with Mr. Larsen for two months before leaving recently for the Line Material factory.

N.E.M.A. Bans Cutthroat Refrigeration Selling

At a meeting held in Cleveland, Ohio, early in August, members of the refrigeration division of the National Electrical Manufacturers Association unanimously adopted a resolution condemning destructive advertising and selling methods. The resolution read as follows:

Whereas, The manufacturers of mechanical refrigerators are collectively interested in creating the largest possible group of prospective purchasers of their product and in sharing in the business so created according to their individual merits; and,

Whereas, Any expedient that may be adopted by individual manufacturers which may cause the public to question the merits of mechanical refrigeration of any type and thereby tend to diminish the total volume of refrigeration sales, is harmful to the industry generally and in the last analysis to the individual manufacturers. Therefore be it

Resolved, That the refrigeration division of N.E.M.A does not approve selling or advertising policies or any other expedient which encourages discussion of the relative merits of the various types of refrigerants, and, be it

Further Resolved, That the members of this organization will use every means at their disposal to urge their distributors and dealers and all employees of such organizations to act according to the spirit and the letter of this resolution.

Three goverenmental agencies in Washington in a statement made public recently gave assurances of the general safety of present-day household refrigeration methods. These were the Public Health Service, the Bureau of Standards and the Bureau of Mines, and the purpose of their statement was to "relieve any undue anxiety in the minds of those possessing household refrigerating systems."

Western Representatives Appointed for Lighting Fixtures—Pass & Seymour, Inc., Syracuse, N. Y., manufacturers of wiring devices and porcelain lighting fixtures, have recently concluded arrangements for future distribution of their products on the Pacific Coast. In Southern California they will be represented by the **H. B. Squires Company** through that organization's Los Angeles headquarters; **George W. Rosekrans,** Pass & Seymour's own representative in San Francisco, will have charge of sales in Northern California; and in the Northwest **J. M. Cavanaugh,** manufacturers' agent of Portland, will represent Pass & Seymour in Oregon and Washington. The appointments were made by C. L. Nicholson, general sales manager of Pass & Seymour, Inc., who recently spent some time on the Pacific Coast.

Manufacturers of Electrical Apparatus Merge—A merger recently was effected between the **Century Electric Company,** of St. Louis, and **Roth Brothers & Company,** of Chicago, whereby the latter company will hereafter be known as Roth Brothers Division of the Century Electric Company.

Portland Jobbers' Salesmen Take Simultaneous Vacation—As the result of an agreement among all the electrical jobbers of Portland, Ore., all the outside salesmen employed by the parties to the agreement took their vacations simultaneously from July 7 to July 21.

Electrical Exposition to Be Held in New York in October—Announcement has been made of the First National Electrical Exposition, to be held in the Grand Central Palace, New York, Oct. 7-12, under the joint auspices of the Electrical Board of Trade of New York and the New York Electric League. Every branch of the electrical industry will be represented, and many new discoveries, developments and uses for electricity will be displayed and discussed. The hours between 10 a.m. and 2 p.m. daily have been reserved for the trade only, after which the public will be admitted.

To Represent Motor Manufacturers —The Emerson Electric Manufacturing Company, St. Louis, has appointed **The Marwood Company** of Seattle, San Francisco, Portland and Spokane, as distributor of Emerson motors on the Pacific Coast. Stocks will be carried by The Marwood Company in its warehouses in each of the cities named.

Electro-Kold Corporation Holds Annual Picnic—Two hundred employees of the Electro-Kold Corporation, of Spokane, attended the annual picnic held Sunday, Aug. 11, at Lake Coeur d'Alene, Idaho. H. C. Cameron was chairman of the event, assisted by Earl Amick, Charles Kee, Hugh Smead and Jay Mount.

President of Delta-Star Company Returns—H. W. Young, president of the Delta-Star Electric Company, Chicago, returned last month on the "Olympic" following a two months' trip to Europe. He visited England, France, and Germany, where he inspected the plants of several manufacturers of electrical equipment.

Range Salesman Added to Estate Stove Company's Staff—Jack P. Davidson, Pacific Coast manager of the Estate Stove Company, has announced the addition of George C. Osborn to the San Francisco organization engaged in the sale of Estate electric ranges.

C. F. Braun & Company, of Alhambra, Calif., has opened a sales and engineering office in San Francisco in the Russ Building, with Milton H. Roths as manager.

Gem Appliances, Inc., 280 Madison Ave., New York, has appointed the **Tilden-Kienly Company,** 545 Sutter St., San Francisco, as distributor of its household electrical appliances on the Pacific Coast.

The George Belsey Company, distributors of General Electric products in Los Angeles, has opened a new store at Wiltshire and Western Aves. in that city.

New Equipment

"Super-Sun" Lamp

In the L. & H. Super-Sun lamp of **Luckenbach & Hallberg, Inc.,** 29 West 57th St., New York City, the sun rays are sent in two directions at once, furnishing radiation to two or more persons at the same time. Its radiation is guaranteed to be equal to the sun-spectrum, and goggles, it is declared, are not necessary.

The lamp may be used on a.c. or d.c. circuits, 100 to 125 volts, and is also made for 200 to 250 volts. Its amperage is 10 at normal, maximum 15 at starting. It is claimed to operate 15 hours without carbon adjustment, one pure carbon lasting 25 to 30 hours.

The carbon arc unit is enclosed in a cabinet of modern design, finished in gold, old ivory or silver.—Electrical West, Sept. 1, 1929.

Corn Popper

In a new Universal electric corn popper that is being introduced by **Landers, Frary & Clark,** New Britain, Conn., the corn is stirred by occasionally turning the large knob on top of cover. The popper compartment is separate from the heating receptacle

for convenient emptying. Salt and butter seasoning can be used freely without affecting the rust-proof body.

The popper has highly polished aluminum body with nickel-plated legs and handle brackets and ebonized handles and knob. The diameter of the popper compartment is 7¾ in. and its depth 3 in. The popper, No. E933, is rated at 625 watts. Intended retail price is $5.—Electrical West, Sept. 1, 1929.

"Drip" Coffee Percolator

For making coffee by the "drip" method, **The Armstrong Electric & Manufacturing Corporation,** Huntington, W. Va., is introducing its new automatic electric drip coffee percolator. With this new type of percolator, the manufacturer states, the perfect beverage coffee is produced—a coffee retaining the aroma and flavor of the coffee without the bitter or woody taste that results from boiling.

This new percolator is made in two parts—the base, containing a closed type Chromalox heating element and the automatic switch, and the 6-cup copper coffee percolator itself.

The automatic feature works on the

same principle as a teeter-totter or see-saw. The percolator is divided into two compartments—one into which the water is poured, and the other from which the finished coffee is poured. Filling the water compartment causes the percolator to tip down slightly on the right side. This operates a switch in the base on which the percolator rests and turns the current on. When the water in the water compartment has been transferred through the coffee and into the coffee compartment, the weight of the percolated coffee tilts the percolator down and the switch cuts off the current. There is no timing mechanism, no lever and no clock. The amount of water used determines the time the current is on. The retail price of the percolator is $14.75.—Electrical West, Sept. 1, 1929.

Fry and Doughnut Kettles

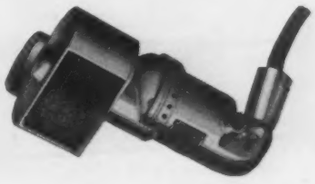
For deep fat frying in hotels, restaurants and bake shops, the **Edison Electric Appliance Company, Inc.,** 5600 West Taylor St., Chicago., Ill., announces an 8-kw. doughnut kettle and a 12-kw. fry kettle.

These Edison fry kettles save from 25 to 50 per cent of the fat formerly used when heating the kettle from the bottom, according to the maker. An adjustable temperature control prevents fat from burning, and a foam guard keeps the fat from running over. Retail price of each kettle is $385.—Electrical West, Sept. 1, 1929.

Meat Block Brush

A new electrical aid for the butcher is the Hutchinson electric meat block brush, manufactured by the **Beardsley Company,** 3703 East 93rd St., Cleveland, Ohio.

This device is designed for relieving butchers of the disagreeable part of one



of their hardest daily tasks—cleaning the surface of the meat block. The brush operates from the ordinary lighting circuit. It is merely guided over the block, leaving the surface clean, level, smooth and sanitary. The brush is cleaned by dipping it into hot water and turning on the motor.—Electrical West, Sept. 1, 1929.

Portable Electric Heater

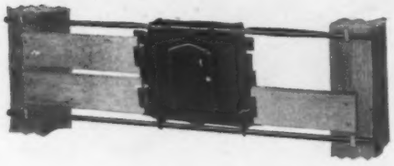
A unique type of room heater is being marketed in the West by the **Hoffman Specialty Company,** 816 West Fifth St., Los Angeles. The device, known as the Thermador, is designed in the form of an occasional table and delivers either heated or unheated air, as desired. A motor-driven fan, concealed under the table's top, draws the cold air up from

the floor and when heated air is required passes it over and around the heating coils, and then circulates the heated air through the room. The heated air is sprayed out in a horizontal plane in all directions through an aperture which extends entirely around the table beneath the top. The Thermador is manufactured by the Hoffman company at Waterbury, Conn.—Electrical West, Sept. 1, 1929.

Electric Outlet Box

An all-in-out outlet box with no hangers to bolt on, no covers to screw on, and no nuts, bolts or screws is announced by the **Triplex Electrical Manufacturing Company,** Chicago.

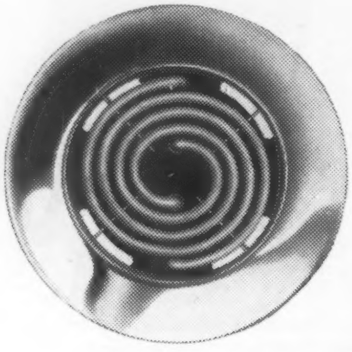
This box is supported by two rods, which insures box remaining perfectly



plumb, avoiding crooked switch or receptacle plates. The rods have sufficient strength to prevent the box being pushed back or out after being set in place, thus insuring the box being flush with the plaster line. Slots on the cover receive lath ends, preventing loose laths. The cover slips on in slots provided for it and is locked on securely by clinching clip with a hammer. The box slides on the rod supports to any desired place between the studs, and is locked in place by clinching clip with a hammer. The boxes are completely assembled, including box, cover, rods and nails. Nothing but a hammer is needed to install.—Electrical West, Sept. 1, 1929.

Hi-Speed Range Unit

The Edison Electric Appliance Company, Chicago, announces a new Hotpoint Hi-Speed calrod electric range surface unit that heats approximately 20 per cent faster than other units of

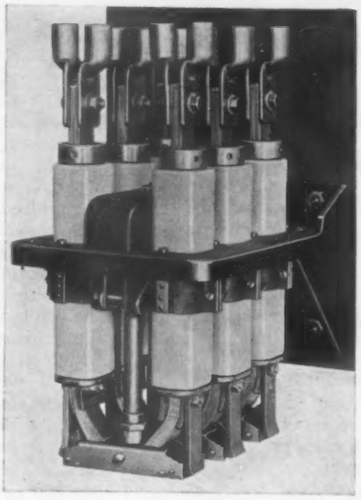


the same wattage. Tests have shown that it requires 15 per cent less energy to bring cold water to a boil with the 1,200-watt unit than it does with the 1,000-watt unit. Two red-hot glowing spirals of calrod are in direct contact with the utensil. The heat does not travel through any intervening air space and no bricks or extra heat storage of any kind are needed. The calrod and the cooking utensil itself take the place of the bricks.

The heating coils have heavy knife-blade terminals which enter sturdy contacts that are in a cool place. This makes it possible to insert or remove a coil in a moment without using any tools. The extra heavy contacts are made to stand any amount of abuse. The new unit is interchangeable with any Hotpoint open-coil or calrod unit on any Hotpoint range manufactured during the past ten years. The metal surrounding the unit is finished in Hotpoint chrome plate.—Electrical West, Sept. 1, 1929.

Oil Circuit Breaker

A new type of oil circuit breaker made in capacities from 200 to 2,000 amp., from 2,500 to 15,000 volts, and with interrupting capacity from 20,000 to 40,000 kva., is announced by the

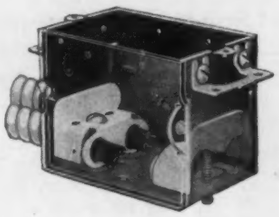


Roller-Smith Company, New York. The switches are made as two-pole and three-pole devices, automatic and non-automatic, single and double throw, for switchboard, wall and cell mounting; also for hand operation, normal and remote control, and electrical operation.

Outstanding characteristics claimed for this new line of oil switches are: (1) Continuous laminated conductor from terminal to moving member, (2) moving, self-aligning contact of drawn copper, (3) arcing tips utilize electromagnetic stresses to increase contact pressure, (4) enclosed straight-line mechanism, (5) conductors rigidly clamped in heavy porcelain, (6) a double flange for the tank seat permits free venting between tank and frame, with great reduction in tendency to oil throw, (7) the volumes for oil and gas expansion are exceptionally large.—Electrical West, Sept. 1, 1929.

Switch Box With Clamp

An improved bushed clamp, No. 7B, is a feature of a new sectional switch box, the Gem X-5, recently announced



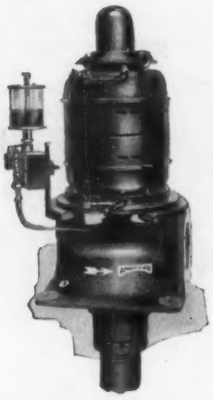
by the **Jefferson Electric Company,** 1500 South Laflin St., Chicago.

This clamp is provided with bushed holes which protect the insulation of the wire and eliminate the need of extra brass ferrules when metallic cable is used. Another feature of the clamp is the upright flange, which closes the hole around the incoming cable to comply with the National Electrical Code.—Electrical West, Sept. 1, 1929.

Deep Well Turbines

To meet a demand for a turbine to fit small bored wells, the **American Well Works,** Aurora, Ill., announces new 6-in. and 8-in. deep well turbines. Each turbine consists of the turbine head proper, which is the driving unit, the supporting pipe, which encloses the driving shaft, and the turbine itself.

The turbine head consists of the vertical motor mounted on a very rigid and compact base. The thrust bearing



of the motor is designed to carry the load of the line shaft and impellers. To the turbine head is attached the supporting pipe, to the lower end of which is attached the turbine proper. All bearings are oil lubricated by gravity feed from the surface, the gravity feed being electrically controlled.—Electrical West, Sept. 1, 1929.

Linemen's Equipment

A new line of Stephens linemen's belts and pole climbers has been announced by the **Western Hardware and Tool Company**, Sacramento, Calif. The new tool belts have been designed for the comfort and safety of the lineman, a feature being that no rivets extend through the leather on the body side of the belt. Safety straps have been fitted with double leather protection at any point where contact is made with metal.

The Stephens climbers are of the "offset" type, each climber being designed either for right or left leg wear. —Electrical West, Sept. 1, 1929.

Recent Publications

High-Tension Switching Equipment—Five publications recently released by the **Pacific Electric Manufacturing Corporation**, 5815 Third St., San Francisco, are as follows: Bulletin No. 23, giving details of construction and specifications of choke coils; Bulletin No. 24, on motor controls for operating group controlled air-break switches; Bulletin No. 25, describing neutral current transformers for residual relays on grounded neutral systems; Bulletin No. 26, showing standard steel substations; and Bulletin No. 27, describing a new stick operated disconnecting switch for voltages up to 73 kv.

Manual Controllers, Switchboards and Limit Stops—Bulletin No. 970 describing a.c. manual controllers, No. 1021 covering d.c. Type "S" crane switchboards, No. 1037-D covering a.c. and d.c. Type B limit stops, and price sheet No. 1004-A applying to Type WB brakes are being distributed by **The Electric Controller & Manufacturing Company**, Cleveland, Ohio.

Universal Catalog—Catalog No. 3N of Universal electric appliances in chromium plate and new patterns in nickel plate is being distributed by **Landers, Frary & Clark**, New Britain, Conn. Price list corrected to June 20, 1929, is included.

Semi-Enclosed Motor—The uninclosed motor, manufactured by the **U. S. Electrical Manufacturing Company**, 200 East Slauson Ave., Los Angeles, is described in a bulletin entitled "The Story of U. S. Motors."

Portable Electric Lamps—Full description of Aladdin lamps, with color illustrations and prices, is given in Catalog No. 29 recently issued by the **Aladdin Manufacturing Company**, Muncie, Ind.

General Electric Publications—Recent publications issued by the **General Electric Company**, Schenectady, N. Y., include the following:

GEA-720A, on high-speed circuit breakers.
GEA-488A, on portable instrument current and potential transformers.
GEA-907B, on the G-E Novalux 24-in. aviation beacon.
GEA-897, on small air-cooled transformers and auto-transformers.
GEA-1134, on single-phase directional-ground relays.
GEA-1061A, on Type CD and CDP recording instruments.
GEA-938A, on accessories for switchboards.
GEA-752A, on Type BD direct-current motors.
GEA-876C, on Type WD-400A arc welder.
GEA-724B, on totally enclosed, fan-cooled squirrel-cage motors.
GEA-416B, on automatic starting compensators for squirrel-cage induction motors.
GEA-1009A, on Type WD-300A gas-engine-driven arc welder.
GEA-571C, on G-E arc-welding accessories.
GEA-1078, on oil-pressure reservoirs for high-tension cable joints.
GEA-1047, on switchboard devices, current-limiting resistors and fusible cutouts.
GEA-1113, on connectors and fittings for outdoor switching equipment.
GEA-1123, on fusible cutouts and current-limiting resistors for outdoor switching equipment.

"'Calyx' Core Drills"—Core drills manufactured by the **Ingersoll-Rand Company**, 11 Broadway, New York, are described in a bulletin of this title which will be sent upon request to the company to anyone interested in determining by means of cylindrical cores the character and extent of materials in mines, quarries, oil and water wells, road pavement, etc.

"Fibrex Tree Wire"—The specially insulated wire manufactured by the **Simplex Wire & Cable Company**, Boston, for use by public utility companies in districts where distribution lines run through trees, is the subject of an illustrated booklet with this title published recently by the Simplex company.

"Light for Library Bookstacks"—This is the title of Booklet No. 1000 recently published by the architectural department of the **Holophane Company, Inc.**, 342 Madison Ave., New York. It describes Holophane lighting units specially designed for libraries, record vaults, stock bins, locker rooms, and other shelf storage lighting.

Groundometers—Bulletin No. 110 is a recent publication of the **Borden Electric Company**, 480 Broad St., Newark, N. J., describing the Type D groundometer, which the company explains is a modified Wheatstone bridge designed particularly for measuring the resistance of earth electrodes.

Multiple Operator Arc Welding Sets—Leaflet No. 20421 entitled "Multiple Operator Arc Welding Equipment" has been announced by the **Westinghouse Electric & Manufacturing Company**, East Pittsburgh. This pamphlet presents the application, distinctive features and general principles of construction of various types of stationary and portable multiple operator arc welding sets.

Superheater for Stationary Boilers—"The Elesco Multiple-loop Single-pass Superheater" is the title of Bulletin T-19 issued by **The Superheater Company**, 17 East 42nd St., New York. The bulletin describes how the Elesco superheater is adaptable to all types of boilers.

"Armorclad Switchgear"—This is the title of Bulletin No. 1145 of the **Allis-Chalmers Manufacturing Company**, Milwaukee, Wis. It describes this company's oil circuit breaker equipment for power stations, substations and general industrial purposes.

New Appliance Catalog—The Eagle Electric Manufacturing Company, 59 Hall St., Brooklyn, N. Y., has for distribution a new edition of its catalog showing a complete line of Bakelite fittings and household appliances, including a new fuse plug.

Amperehour Meters—Bulletin No. 78 issued by the **Sangamo Electric Company**, Springfield, Ill., is devoted to a description of the Sangamo Type N amperehour meters of the mercury-motor type. Price lists are included.

Hydraulic Turbines—Bulletin No. 122, describing the Smith-Kaplan automatically adjustable blade hydraulic turbine, has recently been released by the **S. Morgan Smith Company**, York, Pa.

Large Vertical Motors—A new bulletin, No. 159, has been issued by the **Wagner Electric Corporation**, St. Louis, covering all types of Wagner large vertical motors in ratings of 1½ to 30 hp.

Pipe Fittings—The Delta-Star Electric Company, Chicago, has for distribution upon request Bulletin No. 70 describing and listing the company's drop forged "Uniclamp" pipe fittings.

Outdoor Disconnecting Switches—The Champion Switch Company, Kenova, W. Va., is distributing Bulletin "E," describing and giving engineering data on switches from 400 to 3,000 amp. for various commercial voltages.

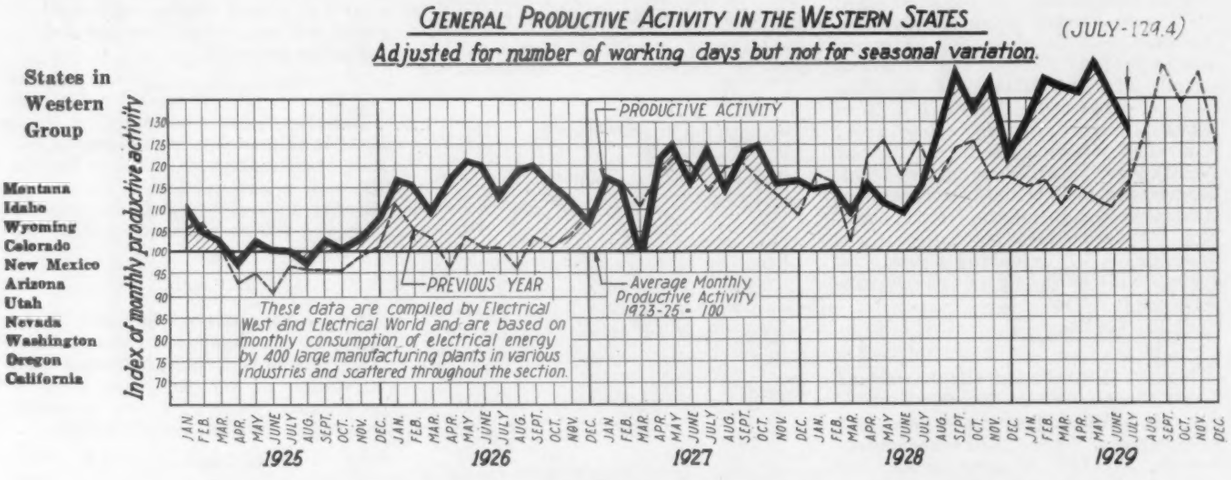
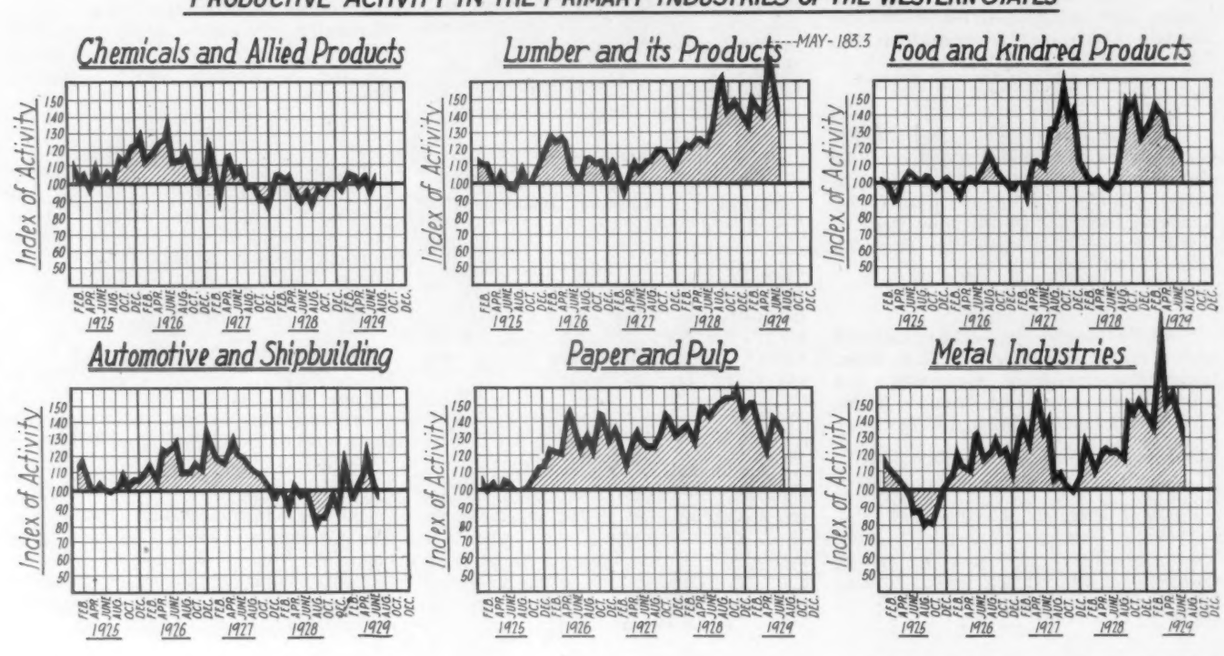
ELECTRICAL WEST Barometer of Industrial Activity in Western States

OPERATIONS in the manufacturing plants of the Western states during July were on a plane materially above July last year. Reports on the consumption of electrical energy by some 400 large manufacturing plants scattered throughout the Western states indicate that the rate of activity in these plants during July was 3.5 per cent under June, but was 11.2 per cent over July last year. It appears now that the peak of operations in this section so far this year was reached in May. During the first seven months of the year the average rate of operations was 18.2 per cent over the same period last year.

Seven of the primary industrial groups of the section—chemicals and allied products, food products, forest products, metals group, rubber products, shipbuilding, and stone, clay and glass—reported a rate of operations during July materially above July last year. On the other hand the paper and pulp industry was operating under the same month last year.

The opening of August finds the volume of general business in the country as a whole on a plane about 2 per cent above that witnessed at the opening of July, and on a plane 4 per cent above that reported at the opening of August last year. Business men throughout the country indicate that they expect to do an average volume of business during the next 90 days about 4 per cent above that being witnessed at the opening of August and of proportions about 6 per cent above the volume witnessed during the same 90-day period last year. Every section of the country expects to do a large volume of business as the fall begins.

Indexes of Industrial Activity in the Western States

(All figures adjusted for number of working days.)

	July 1929	June 1929	July 1928	Av. 1st 7 mos. 1929	Av. 1st 7 mos. 1928
All industry	129.4	134.2	116.5	136.6	115.4
Chemical and allied products	104.4	91.2	92.3	97.9	99.1
Food and kindred products	118.8	121.5	108.3	133.7	105.9
Forest products	148.0	161.0	135.8	154.5	127.0
Metals group	135.0	134.1	123.4	156.9	123.3
Paper and pulp	134.0	142.0	147.5	141.6	142.8
Rubber products	179.7	197.0	160.0	196.2	146.4
Shipbuilding	95.0	99.7	75.6	105.9	93.1
Stone, clay and glass	149.2	167.0	111.5	141.9	147.8